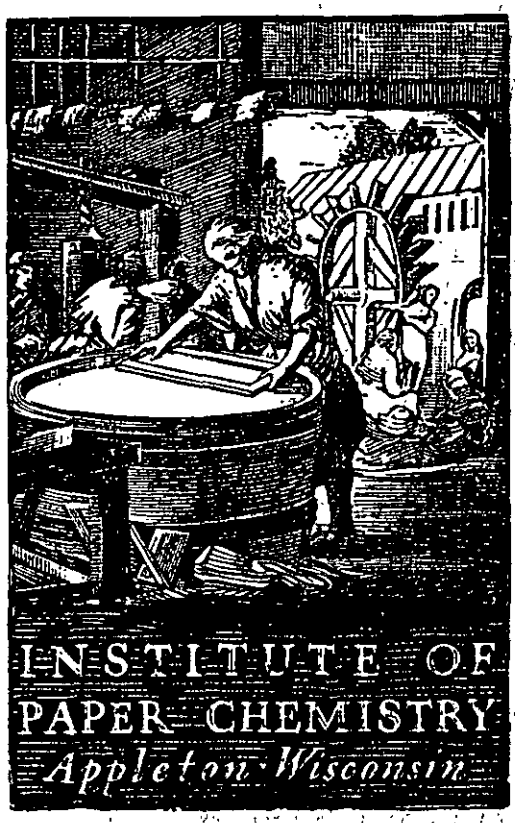

COMPILATION OF REPLIES TO LINERBOARD QUALITY CONTROL QUESTIONNAIRES

Project 1108

Progress Report Ten

to

FOURDRINIER KRAFT BOARD INSTITUTE, INC.

July 8, 1958

THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

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INTRODUCTION

At the request of the Board of Directors of the Fourdrinier Kraft Board Institute, The Institute of Paper Chemistry has conducted a survey among F.K.I. member mills to obtain information regarding linerboard quality control procedures--i.e., tests used, sampling procedures, calibration procedures, acceptance limits, etc. The results of this survey are presented in this report. A scrambled code system has been used in the various parts of the report to avoid identifying individual mills with their particular procedures and specifications. The survey covered the following grades of Fourdrinier kraft linerboard: 26 lb., 33 lb., 38 lb., 42 lb., 47 lb., 69 lb. and 90 lb.

This report summarizes information on linerboard quality control from seventeen mills. Shown in Table I for each of these mills are the test properties which they reported as having acceptance limits. It may be noted in Table I that three tests--namely, basis weight, bursting strength and moisture content--are used by the majority of the mills in their linerboard quality control programs. Other tests used by some of the mills include size, brightness, mottle number, caliper, Vanceometer, porosity, and moisture streaks. In view of the observation that most of the mills use three principal tests, whereas a minority use a few other tests, the present report is divided into four parts as follows:

(1) Part I is a compilation of replies to the Linerboard Quality Control Questionnaire with regard to basis weight.

(2) Part II is a compilation of replies to the Linerboard Quality Control Questionnaire with regard to bursting strength.

TABLE I

TEST PROPERTIES HAVING ACCEPTANCE LIMITS

Mills															
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
26-lb. Grade															
Weight Mullen Moisture	Weight Mullen Moisture	Weight Moisture Mullen Size	Weight Moisture	Weight Mullen	Weight Mullen Moisture Size	Weight Mullen Moisture	Weight Mullen Size Moisture	Weight Mullen Moisture Caliper	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture
33-lb. Grade															
Weight Mullen Moisture	Weight Mullen Moisture	Weight Moisture Mullen Brightness Size Mottle No.	Weight Mullen Moisture	Weight Mullen	Weight Mullen Moisture Size	Weight Mullen Moisture	Weight Mullen Size Moisture	Weight Mullen Moisture Caliper	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture
38-lb. Grade															
Weight Mullen Moisture	Weight Mullen Moisture	Weight Moisture Mullen Brightness Size Mottle No.	Weight Mullen Moisture	Weight Mullen	Weight Mullen Moisture Size	Weight Mullen Moisture	Weight Mullen Moisture Size Moisture streaks	Weight Mullen Moisture Caliper	Weight Mullen Moisture Vanceometer	Weight Mullen Moisture Vanceometer	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture
42-lb. Grade															
Weight Mullen Moisture	Weight Mullen Moisture	Weight Moisture Mullen Brightness Size Mottle No.	Weight Mullen Moisture	Weight Mullen	Weight Mullen Moisture Size	Weight Mullen Moisture	Weight Mullen Moisture Size Moisture streaks	Weight Mullen Moisture Caliper	Weight Mullen Moisture Vanceometer	Weight Mullen Moisture Vanceometer	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture
47-lb. Grade															
Weight Mullen Moisture	Weight Mullen Moisture	Weight Moisture Mullen Brightness Size Mottle No.	Weight Mullen Moisture	Weight Mullen	Weight Mullen Moisture Size	Weight Mullen Moisture	Weight Mullen Moisture Size Moisture streaks	Weight Mullen Moisture Caliper	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture
69-lb. Grade															
Weight Mullen Moisture	Weight Mullen Moisture	Weight Moisture Mullen Brightness Size Mottle No.	Weight Mullen Moisture	Weight Mullen	Weight Mullen Moisture Size	Weight Mullen Moisture	Weight Mullen Moisture Size Moisture streaks	Weight Mullen Moisture Caliper	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture
90-lb. Grade															
Weight Mullen Moisture	Weight Mullen Moisture	Weight Moisture Mullen Size[a] Mottle No.[a]	Weight Mullen Moisture	Note b	Weight Mullen Moisture Size	Weight Mullen Moisture	Weight Mullen Moisture Size Moisture streaks	Weight Mullen Moisture	Note b	Note b	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture	Weight Mullen Moisture

[a] Laminate; base stock tested.
[b] None of this grade is produced by this company.

(3) Part III is a compilation of replies to the Linerboard Quality Control Questionnaire with regard to moisture.

(4) Part IV is a compilation of replies to the Linerboard Quality Control Questionnaire with regard to miscellaneous tests.

Because of the fact that linerboard quality control questionnaires from two mills were not received in time for inclusion in the original compilation, a separate compilation has been made for these two mills in order to avoid retyping the many tables that would be affected by the addition of these results to them. This separate compilation is given in the appendix.

PART I

COMPILATION OF REPLIES TO THE LINERBOARD

QUALITY CONTROL QUESTIONNAIRES

FOR THE

TEST PROPERTY OF BASIS WEIGHT

Table Number	Subject
II	Test instrument and calibration data
III	Conditioning data
IV	Sampling data
V	Acceptance limits. Part (a): Largest unit of production which is accepted for this test property (for shipment or use) without further testing.
VI	Acceptance limits. (Continued): Part (b): Upper and/or lower acceptable average test values (for shipment or use) applicable to various grades for unit of production indicated in Part (a).
VII	Acceptance limits. (Continued). Part (c): If some units indicated in Part (a) are rejected as a unit without further testing, indicate below limiting average test values which do not cause rejection and which permit subdivision of Part (a) units for retesting.
VIII	Acceptance limits. (Continued). Part (d): Next largest unit of production which is accepted for this test property (for shipment or use) without further testing.
IX	Acceptance limits. (Continued). Part (e): Limiting average test values acceptable for shipment or use of unit of production indicated in Part (d).
X	Acceptance limits. (Continued). Part (f): Is acceptance or rejection of Part (d) units final on basis of original test for conformance with acceptance limits in Part (e). Part (g): If answer to Part (f) is "no," describe any additional procedure for retesting unaccepted product.

TABLE II

TEST PROPERTY: BASIS WEIGHT
TEST INSTRUMENT AND CALIBRATION DATA

Mill	(1) Name and Model of Test Instrument	(2) How Frequently are Paper Machine Control Test Instruments in Regular Use Calibrated?	(3) Describe Briefly Procedure Used for Calibrating or Standardizing Test Instruments and Their Key Components	(4) Instrument Calibration is Performed How Often By: (a) Testing Personnel	(b) Testing Supervisor	(c) Instrument Mechanic	(d) Other
A	Toledo basis weight scale (long beam model)	Once per day.	Level, zero reading, and clamping are checked each shift. Test weights are used to calibrate the instrument each day.		Once per day.	Three times per week: Mon., Wed., and Friday.	
B	Toledo ream weight scale.	Daily.	Check balance for zero daily. Check with standard weights weekly.	Daily			
C	Toledo scales #9212 BR and Veeder Root 110 volt magnetic lineal footage counters	Checked daily.	Toledo scales are checked daily against standard weights. Outside inspector comes in and checks scales approximately every 3 months. Veeder Root lineal footage counters are checked against felt measuring counter daily.	(1)	(2)	(3)	
D	Toledo Scale Company (Model 9210-BH, capacity: 2 lb.)	Every 8 hours.	A brass clock having a weight equivalent to a standard paper basis weight (58.5 lb.) is used daily to calibrate each mill and laboratory basis weight scale.	Every 8 hours.		Every 24 hours.	
E	Toledo basis weight scale (Model 9210AQ)	Every 60 days.	Toledo serviceman makes regular inspections and repairs and calibrates the scales		Daily checks.		Toledo serviceman every 2 months.
F	Toledo basis weight scale (long arm) Associated Patents Square Foot Cutter.	Once every 24 hours.	Square foot sample is measured and checked in template. Blades on cutter are sharpened and "trued" when necessary. Scales are checked with standard weight furnished by manufacturer.	Once every 8 hours		Once every 24 hours.	Scales overhauled by factory-serviceman every 6 months.
G	Toledo Ream Weight Scale	Daily	Check balance for zero daily. Weekly check with known weights.	Daily			
H	Toledo Basis Weight Scale	Every 3 months—every week.	Checked weekly by dead weight. Checked every three months by Toledo service department under contract.		Weekly		Quarterly. (Toledo service dept.)

TABLE II (Continued)

TEST PROPERTY: BASIS WEIGHT
TEST INSTRUMENT AND CALIBRATION DATA

Mill	(1) Name and Model of Test Instrument	(2) How Frequently are Paper Machine Control Test Instruments in Regular Use Calibrated?	(3) Describe Briefly Procedure Used for Calibrating or Standardizing Test Instruments and Their Key Components	(4) Instrument Calibration is Performed How Often By: (a) Testing Personnel	(b) Testing Supervisor	(c) Instrument Mechanic	(d) Other
I	Toledo Basis Weight Scale. Model 9210 AQ	Three times per day.	The zero reading is adjusted if necessary by leveling scale; std. one-ounce weights are then weighed on scale. Scale should give correct reading at zero, one, two, and three ounces. This covers the range of the fan type scale. On repairing and cleaning, the scales are adjusted to give this calibration.	As needed	Three times per day.	On repair or cleaning.	Backtenders; as needed.
J	Toledo Basis Weight Scale (Model 9210)	Approximately monthly.	Check with known weights.		Whenever necessary.		Toledo serviceman; approx. monthly.
K	Toledo Basis Weight Scale (Model 9210)	Approximately monthly.	Check with known weights.		Whenever necessary.		Toledo serviceman; approx. monthly.
L	Toledo Basis Weight Scale (Model 9219)	Three times per day.	Scale is checked and adjusted, if necessary, with standard check weights.		Three times per day.		
M	Cady 0-240 lb./1000	Every 8 hours	—	Every 8 hours (minimum)			Paper mill chemist (daily)
N	Toledo Basis Weight Scale (Model 9210) (4 in use)	Toledo scale service engineer overhauls scales once a month.	Standard brass weights of 20 lb. and 80 lb. hung by each scale. Scales checked with the brass weight every shift and twice by quality control technician.	Each shift (8 hours)	Twice daily.		
O	Toledo Basis Weight Scales, Type 9212.	Once per hour.	Standard weights have been prepared for each grade of paper. Once per hour, each scale is checked by tester responsible by placing the weight, corresponding to the grade being made, on the scale and checking the scale reading. Should the scale reading be off, the scale is adjusted or set aside for the Toledo Serviceman.	Once per hour.			Toledo serviceman; Every 60 days.

TABLE III

TEST PROPERTY: BASIS WEIGHT
SECTION 5 OF QUESTIONNAIRE: CONDITIONING DATA

Mill	(a) Are Board Acceptance Samples Conditioned Before Testing?	(b) If Samples are Conditioned, Describe Conditioning Procedure Briefly.	(c) Are Samples Tested Under Controlled Conditions of Temperature and Humidity?	(d) If Testing is Performed Under Controlled Conditions, Describe Conditions.
A	No		Yes	73 ± 3°F; 50% ± 2% relative humidity
B	No		No	
C	No		Yes	73 ± 3°F.; 50 ± 3% relative humidity
D	Yes	Samples are conditioned for 30 minutes. Basis weights are reported on off-machine conditions as well as on conditioned samples.	Yes	73 ± 3°F.; 50 ± 2% relative humidity
E	See Part (b).	The board is weighed before and after conditioning. The samples are conditioned for 30 min. prior to the final weighing in a constant humidity room. The specifications are based on machine weight or prior to conditioning.	Yes	73 ± 1°F.; 50 ± 2% relative humidity.
F	No		No	
G	No		Yes	70 ± 10°F.; 50 ± 10% relative humidity
H	No. (Time delay would be excessive for control purpose.)		No	
I	No		No	
J	No		Yes	73 ± 2°F.; 50 ± 2% relative humidity
K	No		No	
L	No		No	
M	No		No	
N	No	Out-turn samples are spot checked the following day after 24 hours of conditioning. Three samples per shift per machine are weighed and compared to the weight at the time of manufacture.	Yes	73 ± 3.5°F.; 50 ± 2% relative humidity
O	No		No	

TABLE IV

TEST PROPERTY: BASIS WEIGHT
SECTION 6 OF QUESTIONNAIRE: SAMPLING DATA

Mill	(a) Describe Form of Reel Sample, Number of Specimens per Reel Sample, Number of Measurements per Specimen, Distribution of Measurements Across Machine, and Orientation of Measurements with Respect to Specimens.	(b) If Roll Samples are Used, Supply Same Information for Them.	(c) If Samples are Used to Represent Other Units of Product (Such as a Set of Rolls) Supply Same Information for Them.
A	The reel is sampled at 5 positions: F, FC, C, BC, and B. Two 12" x 12" specimens are cut from each position sample. The two 12 x 12's cut at each position are in line with each other in the machine direction. The two specimens from each position are weighed together and treated as one.	The specimens are cut from the front center and back center positions across the roll and are then weighed together as if they were one specimen.	
B	Twelve samples taken across width of reel. Samples weighed and averaged for reel weight.		
C	Ten one-square-foot specimens equally spaced are taken from across the reel and weighed on the Toledo scales. The basis weight determined in this manner is used primarily as a guide to the paper machine operators. The board is accepted or rejected on basis weight determined by mathematical calculations based on the lineal footage width and weight of sets of rolls.		Board is accepted or rejected on a one set of rolls basis.
D	Five 12" x 24" samples are obtained across each reel at the front, front center, center, back center, and back.		
E		One square-foot sample is taken from each roll and checked for weight.	
F	Two strips the width of machine make up sample. Square foot samples are cut from each roll position from each ply (total of four square feet per roll). Total square foot samples per reel varies from 12 to 24. Two square foot samples from same cross-direction position weighed together.		
G	Ten one-square-foot samples taken nine inches apart across width of reel. Samples weighed and averaged for reel basis weight.		
H	Eight equally spaced square foot samples cut from across machine from each reel.		

TABLE IV (Continued)

TEST PROPERTY: BASIS WEIGHT
SECTION 6 OF QUESTIONNAIRE: SAMPLING DATA

Mill	(a) Describe Form of Reel Sample, Number of Specimens per Reel Sample, Number of Measurements per Specimen, Distribution of Measurements Across Machine, and Orientation of Measurements with Respect to Specimens.	(b) If Roll Samples are Used, Supply Same Information for Them.	(c) If Samples are Used to Represent Other Units of Product (Such as a Set of Rolls) Supply Same Information for Them.
I	Reel sample is twenty 12" x 12" specimens taken at ten equal spaces across machine. Two specimens from each space are weighed together with scale reading direct in lb. per 1000 sq. ft. This performed by backtender for control purposes only.	Each roll is sampled; two 12" x 12" samples are secured and weighed together with scale reading direct in lb. per 1000 sq. ft.	
J			Full width strip; two 12 x 12 specimens spaced approximately half way between center line and edge; both specimens weighed together on basis weight scale.
K	12" x 12" square samples, 20 to 24 specimens per reel cut across entire reel. Samples weighed by pairs to give 10 to 12 measurements per reel. Every reel is sampled.	Four samples per roll across width of roll; each pair weighed together to give two measurements per roll. Every roll is sampled.	
L	Two 12" x 12" specimens taken in machine direction from each of ten positions across each reel. Each pair of samples is weighed.	Two 12" x 12" specimens taken in machine direction. The two are weighed together.	
M	Five individual 12 x 12 per reel--front, middle, back, front-middle, back-middle.		
M	Two square-foot samples from front, center, and back position across the reel. Once per shift a weight level across the reel 21 positions for control.	Three square-foot samples taken from each roll leaving the winder. Two square-foot samples weighed together to represent the roll weight. Two of these samples are for the customer and third sample for caliper and Mullen test.	
O			A pair of 12 x 12 specimens at random from each area representing a roll cut, weighed together to yield the figure used for that roll and its counterpart in the next reel.

TABLE V

TEST PROPERTY: BASIS WEIGHT
SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS

Part (a): Indicate below by checking appropriate line <u>largest unit of production</u> which is accepted for this test property for shipment or use without further testing.

Unit of Production	Mills A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
One reel	✓	✓				✓	✓	✓[c]					✓		
One roll				✓					✓	✓	✓	✓		✓[d]	
Other (describe)			✓[a]		✓[b]										✓[e]

[a] One set of rolls.

[b] If average for car meets specifications, no further testing.

[c] Could be any combination of reel size up to two 53" diameter sets of rolls.

[d] Two square-foot samples weighed together to represent the roll.

[e] One roll and its counterpart from the next reel following.

TABLE VI

TEST PROPERTY: BASIS WEIGHT
SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS (Continued)

Part (b): Indicate below upper and/or lower acceptable average test values (for shipment or use) applicable to various grades for unit of production indicated in Part (a). (See Table V).

	Mills																
	A	B	C[a]	D	E	F[c]	G	H[d]	I[e]	J	K[a]	L[f]	M	N	O		
26-lb. Grade																	
Finish	Spray	Water	S.F.L.	DF	DF	WF	Steam	DF	SF	SF	DF	SF	DF	SF	W	Water	SF
Market Shipments:																	
Lower limit	25.3	24.7	25.0	25.0	25.5	25.6(25.0)	24.7	26.0	26.0	25	26.0	26.0	26.0	26.0	25	25	25
Upper limit	--	27.3	27.3	28.0	27.3	28.9(29.9)	27.3	--	--	29	--	--	--	--	27	27	29
For Intracompany use:																	
Lower limit	25.3	--	25.0	25.0	--	25.6(25.0)	--	26.0	26.0	25	26.0	26.0	26.0	26.0	25	25	25
Upper limit	--	--	27.3	28.0	--	28.9(29.9)	--	--	--	29	--	--	--	--	28	27	29
33-lb. Grade																	
Finish	Spray	Water	W.F.L.	Starch	WF	WF	Steam	DF	SF	SF	DF	SF	DF	SF	W	Water	SF
Market Shipments:																	
Lower limit	32.3	31.3	32.0	31.8	32.5	32.5(31.9)	31.3	33.0	33.0	32	33.0	33.0	33.0	33.0	32	32	32
Upper limit	--	34.7	34.7	35.2	34.6	36.0(37.0)	34.7	--	--	36	--	--	--	--	34	34	36
For Intracompany use:																	
Lower limit	32.3	--	32.0	31.8	--	32.5(31.9)	--	33.0	33.0	32	33.0	33.0	33.0	33.0	32	32	32
Upper limit	--	--	34.7	35.2	--	36.0(37.0)	--	--	--	36	--	--	--	--	35	34	36
38-lb. Grade																	
Finish	Spray	Dry	Water	Water	W.F.I.	Starch	WF	WF	Water	WF		WF	WF	WF		S	Water	WF
Market Shipments:																	
Lower limit	36.8	36.8	36.8	36.1	37.0	36.6	37.5	37.4(36.8)	36.1	38.0		37	38.0	38.0		37	37	37
Upper limit	--	--	--	39.9	39.9	40.4	39.9	41.2(42.2)	39.9	--		40	--	--		39	39	40
For Intracompany use:																		
Lower limit	36.8	36.8	36.8	--	37.0	36.6	--	37.4(36.8)	--	38.0		37	38.0	38.0		37	37	37
Upper limit	--	--	--	--	39.9	40.4	--	41.2(42.2)	--	--		40	--	--		40	39	40
42-lb. Grade																	
Finish	Spray	Dry	Water	Starch and Water	W.F.I.	Starch	WF	WF	Starch and Water	WF		WF	WF	WF		S	Water	WF
Market Shipments:																	
Lower limit	41.3	41.3	41.3	39.9	40.5	40.4	41.5	41.3(40.7)	39.9	42.0		41	42.0	42.0		41	41	41
Upper limit	--	--	--	44.1	45.2	44.6	44.0	45.5(46.5)	44.1	--		45	--	--		43	43	45
For Intracompany use:																		
Lower limit	41.3	41.3	41.3	--	40.5	40.4	--	41.3(40.7)	--	42.0		41	42.0	42.0		40	41	41
Upper limit	--	--	--	--	45.2	44.6	--	45.5(46.5)	--	--		45	--	--		44	43	45
47-lb. Grade																	
Finish	Water	Starch	W.F.I.	Starch	WF	WF	Starch	WF		WF	WF	WF		S	Water	WF	
Market Shipments:																	
Lower limit	45.8	44.6	45.5	45.1	46.5	46.2(45.4)	44.6	47.0		46	47.0	47.0		46	46	46	
Upper limit	--	49.4	49.4	49.9	49.4	50.9(51.9)	49.4	--		50	--	--		48	48	50	
For Intracompany use:																	
Lower limit	45.8	--	45.5	45.1	--	46.2(45.4)	--	47.0		46	47.0	47.0		45	46	46	
Upper limit	--	--	49.4	49.9	--	50.9(51.9)	--	--		50	--	--		49	48	50	
69-lb. Grade																	
Finish	Water	Starch and Water	W.F.I.	Starch	WF	WF	Starch and Water	WF		WF	WF	WF		S	Water	WF	
Market Shipments:																	
Lower limit	66.9	65.5	67.0	66.5	68.0	68.0(66.8)	65.5	69.0		68	69.0	69.0		67	68	68	
Upper limit	--	72.5	72.5	73.5	72.5	75.0(76.0)	72.5	--		72	--	--		71	70	72	
For Intracompany use:																	
Lower limit	66.9	--	67.0	66.5	--	68.0(66.8)	--	69.0		68	69.0	69.0		67	68	68	
Upper limit	--	--	72.5	73.5	--	75.0(76.0)	--	--		72	--	--		71	70	72	
90-lb. Grade																	
Finish	Water	Starch and Water	W.F.I.		WF	WF	Starch and Water	WF			WF	WF		S	--		
Market Shipments:				Note b						Note b						Note b	
Lower limit	87.5	85.5	88.0		88.0	88.5(87.0)	85.5	90.0			90.0	90.0		87	--		
Upper limit	--	94.5	94.5		94.5	98.1(99.1)	94.5	--			--	--		93	--		
For Intracompany use:																	
Lower limit	87.5	--	88.0		--	88.5(87.0)	--	90.0			90.0	90.0		87	--		
Upper limit	--	--	94.5		--	98.1(99.1)	--	--			--	--		93	--		

For Notes, see following page.

TABLE VI (Continued)

TEST PROPERTY: BASIS WEIGHT
SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS (Continued)

Part (b)

NOTES:

a Limits for market and intracompany shipments are the same; unit is not rejected if test exceeds upper control limit.

b None of this grade is produced.

c Basis weights are adjusted for moisture content; equilibrium basis is 7.8% moisture calculated by means of the following equation:

$$\frac{\text{(wet weight - dry weight) x 100}}{\text{wet weight}}$$

Lower limit figures in parentheses are lowest roll averages allowed (basis weight of 4 square-foot samples). Upper limit figures in parentheses are highest tests permitted in average (basis weight of 2 square-foot samples).

d The average basis weight for the reel is to be within plus or minus 5% of the basis weight ordered by the customer.

e Basis weight at 7.0% moisture. Basis weight on doubtful rolls is calculated by using linear feet, width and weight and appropriate reel moisture test to arrive at a rejection determination. SF indicates spray finish.

TABLE VII

TEST-PROPERTY: BASIS-WEIGHT
SECTION 7 OF QUESTIONNAIRE: *ACCEPTANCE LIMITS (Continued)*

Part (c): If some units indicated in Part (a)--see Table V--are rejected as a unit without further testing, indicate below limiting average test values which do not cause rejection and which permit subdivision of Part (a) units for retesting.

	A[a]	B	C[b]	D[a]	E[c]	F[d]	Mills G	H[e]	I[f]	J[g]	K[f]	L[f]	M	N[b]	O[h]
26-lb. Grade															
Finish		--					Steam						W		
Market Shipments: Lower limit		24.7					24.7						24		
Upper limit		--					--						28		
For Intracompany Use: Lower limit		--					--						24		
Upper limit		--					--						28		
33-lb. Grade															
Finish		--					Steam						W		
Market Shipments: Lower limit		31.3					31.3						31		
Upper limit		--					--						35		
For Intracompany Use: Lower limit		--					--						31		
Upper limit		--					--						35		
38-lb. Grade															
Finish		Water					Water						S		
Market Shipments: Lower limit		36.1					36.1						36		
Upper limit		--					--						40		
For Intracompany Use: Lower limit		--					--						36		
Upper limit		--					--						40		
42-lb. Grade															
Finish		Starch and Water					Starch and Water						S		
Market Shipments: Lower limit		39.9					39.9						40		
Upper limit		--					--						44		
For Intracompany Use: Lower limit		--					--						40		
Upper limit		--					--						44		
47-lb. Grade															
Finish		Starch					Starch						S		
Market Shipments: Lower limit		44.6					44.6						45		
Upper limit		--					--						49		
For Intracompany Use: Lower limit		--					--						45		
Upper limit		--					--						49		
69-lb. Grade															
Finish		Starch and Water					Starch and Water						S		
Market Shipments: Lower limit		65.5					65.5						66		
Upper limit		--					--						72		
For Intracompany Use: Lower limit		--					--						66		
Upper limit		--					--						72		
90-lb. Grade															
Finish		Starch and Water					Starch and Water						S		
Market Shipments: Lower limit		85.5					85.5						86		
Upper limit		--					--						96		
For Intracompany Use: Lower limit		--					--						86		
Upper limit		--					--						96		

[a] Not applicable.
[b] No data.
[c] See Part (a).
[d] Does not apply.
[e] Same as Part (a).
[f] See Part (b).
[g] Part (a) units if rejected are always retested; therefore, no values for Part (c).

TABLE VIII

TEST PROPERTY: BASIS WEIGHT
SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS (Continued)

Part (d): Indicate below next largest unit of production which is accepted for this test property for shipment or use without further testing.

Unit of Production	Mills A	B	C[a]	D[a]	E	F	G	H	I[a]	J[e]	K[a]	L[a]	M	N[e]	O
One set of rolls		√					√								
One roll	√												√		√
Other (describe)					√[b]	√[c]		√[d]							

[a] Not applicable.

[b] If average weight for car is low, all the individual rolls are resampled and low weight rolls are rejected. Same specifications as in Part (b).

[c] Roll as tested and others in same cross direction position.

[d] Could be any combination of reel size up to two 53" diameter sets of rolls.

[e] Unit of production already at one roll.

TABLE IX

TEST PROPERTY: BASIS WEIGHT
SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS (Continued)

Part (e): Indicate below limiting average test values acceptable for shipment or use of unit of production indicated in Part (d)--see Table VIII.

	A	B	C[a]	D[b]	E[c]	Mills F	G	H[d]	I[b]	J[b]	K[b]	L[b]	M	N[a]	O
26-lb. Grade															
Finish	Spray	--			WF	Steam							W	SF	
Market Shipments: Lower limit	25.0	24.7			25.6	24.7							25	25	
Upper limit	--	--			28.9	--							27	29	
For Intracompany Use: Lower limit	25.0	--			25.6	--							25	25	
Upper limit	--	--			28.9	--							28	29	
33-lb. Grade															
Finish	Spray	--			WF	Steam							W	SF	
Market Shipments: Lower limit	32.0	31.3			32.5	31.3							32	32	
Upper limit	--	--			36.0	--							34	35	
For Intracompany Use: Lower limit	32.0	--			32.5	--							32	32	
Upper limit	--	--			36.0	--							35	36	
38-lb. Grade															
Finish	Spray	Dry	Water	Water	WF	Water							S	WF	
Market Shipments: Lower limit	36.5	36.5	36.5	36.1	37.4	36.1							37	37	
Upper limit	--	--	--	--	41.2	--							39	40	
For Intracompany Use: Lower limit	36.5	36.5	36.5	--	37.4	--							37	37	
Upper limit	--	--	--	--	41.2	--							40	40	
42-lb. Grade															
Finish	Spray	Dry	Water	Starch and Water	WF	Starch and Water							S	WF	
Market Shipments: Lower limit	41.0	41.0	41.0	39.9	41.3	39.9							41	41	
Upper limit	--	--	--	--	45.5	--							43	45	
For Intracompany Use: Lower limit	41.0	41.0	41.0	--	41.3	--							40	41	
Upper limit	--	--	--	--	45.5	--							44	45	
47-lb. Grade															
Finish	Water	Starch			WF	Starch							S	SF	
Market Shipments: Lower limit	45.5	44.6			46.2	44.6							46	46	
Upper limit	--	--			50.9	--							48	50	
For Intracompany Use: Lower limit	45.5	--			46.2	--							45	46	
Upper limit	--	--			50.9	--							47	50	
69-lb. Grade															
Finish	Water	Starch and Water			WF	Starch and Water							S	SF	
Market Shipments: Lower limit	66.5	65.5			68.0	65.5							67	68	
Upper limit	--	--			75.0	--							71	72	
For Intracompany Use: Lower limit	66.5	--			68.0	--							67	68	
Upper limit	--	--			75.0	--							72	72	
90-lb. Grade															
Finish	Water	Starch and Water			WF	Starch and Water							S		
Market Shipments: Lower limit	87.0	85.5			88.5	85.5							87	None	
Upper limit	--	--			98.1	--							93		
For Intracompany Use: Lower limit	87.0	--			88.5	--							87		
Upper limit	--	--			98.1	--							93		

[a] No data.
[b] Not applicable.
[c] See Part (d).
[d] Same as Part (b).
* None of this grade is produced.

TABLE X

TEST PROPERTY: BASIS WEIGHT
SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS (Continued)

Mill	Part (f): Is acceptance or rejection of Part (d) units (see Table VIII) final on basis of original test for conformance with acceptance limits in Part (e)--see Table IX?	Part (g): If answer to Part (f) is "no", describe any additional procedure for retesting unacceptable product indicating who decides (1) whether or not retesting is to be performed and (2) how much retesting is done. Include information on any resampling required.
A	No	Tour Foreman can ask for resampling and retest at any time. Acceptance is based on the last test. Retesting is seldom required. The sampling is identical to Part (b) of Section 6.
B	Yes	
C	—	
D	—	
E	No	See Part (d).
F	No	(1) Head tester, (2) Retest sample is same number and type as original from different location on roll. Average of retest and original must meet specifications.
G	Yes	
H	Yes	
I	No	The "no" reply in Part (f) applies to Parts (a) and (b). Doubtful rolls are held for disposition by Paper Mill Supervision. Request by Supervision for basis weight determination at 73°F. and 50% relative humidity, in borderline occurrences, includes resampling of rolls.
J	Yes (applies to Part (b)).	
K	No	Same as Mill I.
L	No	Same as Mill I.
M	No	(1) Quality Control Director. (2) Individual rolls are slabbed down and retested.
N	--	
O	Yes	

PART II

COMPILATION OF REPLIES TO THE LINERBOARD

QUALITY CONTROL QUESTIONNAIRES

FOR THE

TEST PROPERTY OF BURSTING STRENGTH

Table Number	Subject
XI	Test instrument and calibration data
XII	Conditioning data
XIII	Sampling data
XIV	Acceptance limits. Part (a): Largest unit of production which is accepted for this test property (for shipment or use) without further testing.
XV	Acceptance limits. (Continued). Part (b): Upper and/or lower acceptable average test values (for shipment or use) applicable to various grades for unit of production indicated in Part (a).
XVI	Acceptance limits. (Continued). Part (c): If some units indicated in Part (a) are rejected as a unit without further testing, indicate below limiting average test values which do not cause rejection and which permit subdivision of Part (a) units for retesting.
XVII	Acceptance limits. (Continued). Part (d): Next largest unit of production which is accepted for this test property (for shipment or use) without further testing.
XVIII	Acceptance limits.(Continued). Part (e): Limiting average test values acceptable for shipment or use of unit of production indicated in Part (d).
XIX	Acceptance limits. (Continued). Part (f): Is acceptance or rejection of Part (d) units final on basis of original test for conformance with acceptance limits in Part (e).
	Part (g): If answer to Part (f) is "no", describe any additional procedure for retesting unaccepted product.

TABLE XI

TEST PROPERTY: BURSTING STRENGTH
TEST INSTRUMENT AND CALIBRATION DATA

Mill	(1) Name and Model of Test Instrument	(2) How Frequently are Paper Machine Control Test Instruments in Regular Use Calibrated?	(3) Describe Briefly Procedure Used for Calibrating or Standardizing Test Instruments and Their Key Components	(4) Instrument Calibration is Performed How Often By: (a) Testing Personnel	(b) Testing Supervisor	(c) Instrument Mechanic	(d) Other
A	Perkins Mullen Tester Model A	Three times a day by comparing instrument results As repairs become necessary, instruments are given overall calibration and check.	Narrow trim rolls of Manila Tag are stored and strips from them used to test all Mullen machines in operation three times per day. These results are compared and any machine consistently giving results out of line is taken from service and overhauled with calibration following.		Three times per day	When repairing	
B	B. F. Perkins Model A Mullen Tester (motor driven) (4 in use.)	Deadweight test the gage once a week and compare Mullen strip across reel on two Mullen testers.	Deadweight test gage at 50, 75, 100, 150, 200, and 300 lb. Nine square-foot samples are taken per 24 hours for each machine. These samples conditioned 24 hours at 50% R.H. at 73°F. and Mullen tested and compared to the Mullen at the time of manufacture.				Quality control technician: Deadweight once per week.
C	Model A Jumbo Mullen Tester made by B. F. Perkins and Son.	Three times per 8-hr. shift.	Diaphragm checked for distention of 40 to 45 p.s.i. at 1.8 cm. Gage checked routinely by testing a standardized aluminum strip. Clamping pressure checked by calibrated deflection gage. Gages standardized by deadweight tester when out of calibration.		3 times per 8-hr. shift		Sp. Chemist; once per day.
D	Perkins - Model C	Once each eight-hour shift.	Use a 60" x 8" strip of cylinder liner. Make 10 pops on std. tester and ten pops on routine tester. Results must agree within plus or minus 3 lb. Cylinder liner is used because of its uniform Mullen strength. Gages are checked with deadweight tester. Clamping platens are checked by placing carbon paper and bond paper between platens and clamping sheet. Platen must give uniform clamping pattern.	Once each 8-hour shift.		Whenever out of calibration.	

TABLE II (Continued)

TEST PROPERTY: BURSTING STRENGTH
TEST INSTRUMENT AND CALIBRATION DATA

Mill	(1) Name and Model of Test Instrument	(2) How Frequently are Paper Machine Control Test Instruments in Regular Use Calibrated?	(3) Describe Briefly Procedure Used for Calibrating or Standardizing Test Instruments and Their Key Components	(4) Instrument Calibration is Performed How Often By: (a) Testing Personnel	(b) Testing Supervisor	(c) Instrument Mechanic	(d) Other
E	B. F. Perkins Model A Jumbo Mullen Tester	At least weekly.	Several instruments checked against each other by testing supervisor and gages deadweight tested by I.P.C. method. Diaphragm tested by bridge testing personnel. Pressure pattern tests on clamping plates by testing supervisor and also checked with aluminum foil by testing personnel.	Each shift	When necessary		
F	Perkins Model A	Weekly	Comparison of test results from all instruments.				Paper mill chemist--weekly
G	B. F. Perkins Jumbo Mullen Tester	24 hours	A test strip of 42-lb. linerboard is prepared daily and tested by our master Mullen tester in our main lab; each mill lab. Mullen tester is then tested by making 20 pops adjacent to the master pops. If a 3 lb. (+ or -) variation is found, the faulty tester is adjusted by changing diaphragm, checking dial, or making other necessary alterations.			Every 24 hours	
H	Mullen Tester - Model A, Hydraulic Clamping	Three times per day.	Machines are cross-checked with each other using paper sample. Diaphragm pressure and clamping pressure are checked. Once each day checks are made on calibrated aluminum foil.		Three times per day.		
I	Perkirs Mullen Tester (Jumbo)	Once every 24 hours.	Gages: Deadweight tester Diaphragm: Height gage Glycerine: Level checked and air removed. General: Assembled tester checked on linerboard test strip (Test strips sent to FKI for checking).		Every eight hours (Test strip)	Once every 24 hours.	

TABLE IC (Continued)

TEST PROPERTY: BURSTING STRENGTH
TEST INSTRUMENT AND CALIBRATION DATA

Mill	(1) Name and Model of Test Instrument	(2) How Frequently are Paper Machine Control Test Instruments in Regular Use Calibrated?	(3) Describe Briefly Procedure Used for Calibrating or Standardizing Test Instruments and Their Key Components	(4) Instrument Calibration is Performed How Often By: (a) Testing Personnel	(b) Testing Supervisor	(c) Instrument Mechanic	(d) Other
J	Model A Mullen Tester (Motor Driven)	Deadweight gage test, daily; diaphragm distention, 3 times per 8-hour shift.	Diaphragm changed every other day or as needed. Gages changed daily after deadweight testing. Diaphragm distention height checked 3 times a shift. Twice monthly side by side comparison on series of samples using two testing machines. Monthly comparison checks with I.P.C. and Intra-Company Laboratories.	Daily			
K	Model B and C Perkins Tester	Monthly	Gages are checked on a deadweight tester and aluminum test strips are used daily to check testers. Carbon paper is used to determine if platens are parallel.		Daily checks	Monthly (gages)	
L	Model A Mullen Testers (Equipped with hydraulic specimen clamps)	Inspected daily.	See Note a.		✓	✓	
M	Model A Mullen Tester (Motor driven)	Each shift, diaphragm distention; deadweight test 5 days; against other gage daily.	Gages changed and calibrated with deadweight tester every 5 days or oftener when indicated. Check against second gage on manifold daily. Replace diaphragms daily. Check against Inst. of Paper Chem. monthly and intra-company laboratories monthly.	✓			
N	B. F. Perkins Model A Jumbo Mullen Tester	Daily by standardized paper; gages checked weekly.	Several instruments checked against each other. Gages deadweight tested IPC method. Diaphragm tested by bridge. Pressure pattern tests on clamping plates.	Every shift (bridge)	When necessary	Weekly (gages)	
O	B. F. Perkins Model A Mullen Tester	Once per shift	The following items are checked once per shift: Glycerine leakage, diaphragm position, gage indication, and diaphragm extension. Every other day all Model A Mullen testers are checked against standard samples of 42-lb. liner. A periodic check is made on the pressure gages and the entire Mullen tester according to a prescribed procedure. A specified procedure is used to screen new diaphragms.		Once per shift, every other day, or periodically (see Part 3).	According to routine examination schedule.	

TABLE III

TEST PROPERTY: BURSTING STRENGTH
SECTION 5 OF QUESTIONNAIRE: CONDITIONING DATA

Mill	(a) Are Board Acceptance Samples Conditioned Before Testing?	(b) If Samples are Conditioned, Describe Conditioning Procedure Briefly.	(c) Are Samples Tested Under Controlled Conditions of Temperature and Humidity?	(d) If Testing is Performed Under Controlled Conditions, Describe Conditions.
A	No		No	
B	No	24 hours in constant humidity room. Outturn samples are spot checked the following day. Three samples per shift per machine are weighed and compared to the weight at time of manufacture.	Yes	73 ± 3.5°F.: 50% ± 2% relative humidity.
C	No		No	
D	No (Time delay would be excessive for control purposes).		No	
E	No		No	
F	No		No	
G	No		Yes	73 ± 3°F.: 50 ± 2% relative humidity
H	No		No	
I	No		No	
J	No		Yes	70 ± 10°F.: 50 ± 10% relative humidity
K	Yes	Samples are hung in control room thirty minutes before testing.	Yes	73 ± 1°F.: 50 ± 2% relative humidity.
L	No		Yes	73 ± 3°F.: 50 ± 3% relative humidity.
M	No		No	
N	No		Yes	73 ± 2°F.: 50 ± 2% relative humidity.
O	No		Yes	73 ± 3°F.: 50 ± 2% relative humidity.

TABLE III:

TEST PROPERTY: BURSTING STRENGTH
SECTION 6 OF QUESTIONNAIRE: SAMPLING DATA

Mill	(a) Describe Form of Reel Sample, Number of Specimens per Reel Sample, Number of Measurements per Specimen, Distribution of Measurements Across Machine, and Orientation of Measurements with Respect to Specimens.	(b) If Roll Samples are Used, Supply Same Information for Them	(c) If Samples are Used to Represent Other Units of Product (Such as a Set of Rolls) Supply Same Information for Them.
A	Reel sample is a 4" to 6" strip across reel; strip is test specimen, 20 measurements per specimen, evenly spaced measurements across machine, 10 measurements with felt side up and 10 measurements with wire side up. Reel test is used for control purposes only.	Roll sample is 4" to 6" strip across roll. For roll widths under 24", no tests are made; roll widths 24" to 48", six tests; 48" to 65", 8 tests; 65" or over, 10 tests. Tests evenly spaced across roll width, half from one side and half from the other. Roll test results used for acceptance or rejection.	
B	Two square-foot samples are taken front, center, and back. Mullen test one square-foot sample from each position. Three pops up and 3 pops down and average the three samples. These results are for controlling the machine.	Three square-foot samples are taken from each roll leaving the winder. Two samples for customer's use and one sample for Mullen. Mullen test made on 3 rolls across the set and averaged. Three pops up and 3 pops down and averaged for each sample.	
C	One 6" to 8" strip cut full width of reel, 20 pops per strip (specimen); 10 pops from top side (evenly spaced) and 10 pops from bottom side (evenly spaced). Every reel is sampled.	Roll test strip is 4" to 6" wide across full width of roll. Tested approx. every foot on each side. Every roll is sampled.	
D	Eight-inch strip is cut across entire width of reel; 10 equally spaced pops made in one direction (top liner up) and 10 in other direction (top liner down).		
E	One full width reel strip sectioned off to simulate roll cuts; three pops up and three down spaced evenly for each roll cut.		
F	Ten bursts in and 10 bursts out across each reel.		
G	On all linerboard grades, bursting strength is tested and reported by averaging 20 pops (10 on wire side and 10 on top side) across each reel on a 6-in. strip. The wire side and top side pops are alternated in a straight line down the center of the strip.	On 42-lb.; 47-lb., and 69-lb. linerboard, each roll is sampled as well as each reel. Across each roll, 6 pops (3 up, 3 down) are made under off machine conditions and the average Mullen reported. If this average indicates rejection, 20 more pops (10 up, 10 down) are averaged on the same roll sample. All roll strips are tested so as to have an equal number of pops on each side of the board sample.	On 26-lb., 33-lb., and 38-lb. linerboard, each reel is sampled as described in Part (a) and represents 6 to 8 rolls. In the event of failure, a second test is made and if failure is confirmed, entire reel is graded down to next lower weight or repulped in beater.

TABLE XIII (Continued)

TEST PROPERTY: BURSTING STRENGTH
SECTION 6 OF QUESTIONNAIRE: SAMPLING DATA

Mill	(a) Describe Form of Reel Sample, Number of Specimens per Reel Sample, Number of Measurements per Specimen, Distribution of Measurements Across Machine, and Orientation of Measurements with Respect to Specimens.	(b) If Roll Samples are Used, Supply Same Information for Them	(c) If Samples are Used to Represent Other Units of Product (Such as a Set of Rolls) Supply Same Information for Them.
H	One strip, approx. 6" wide taken in cross direction for entire width of each reel; twenty tests made equally spaced. Alternately finish side up and down.	Sampled as described in Part (a); on rolls 65" and wider, ten tests are made; rolls 48" to 65", eight tests; rolls 24" to 48", six tests. Tests equally spaced alternately finish side up and down.	
I	Single strip is obtained across width of machine. Ten pops made up; ten made down (total of 20 evenly distributed across strip.	Roll samples are used only in rechecking. Sample consists of 1 sq. ft. of linerboard. Three pops up; three down (total, 6 pops).	
J	Five samples (one sq. ft. each) taken two feet apart across width of reel. Six pops per specimen, 3 up and 3 down in cross directions of sheet.		
K	The back tender checks a strip across each reel. (15 to 20 points per check).	At least two sets of samples are checked per hour. (A set consists of one sample from each roll across the machine). Four tests are made on each sq. ft. sample: two tests from finished and two from the unfinished side of the sample. One sq. ft. sample is taken from each roll.	
L	Three (3) one square foot specimens, one (1) from the front, middle, and back of each reel. Three (3) tests are made on each side of each specimen. The specimens are oriented in such a manner that one (1) test on the finish side and one test on the wire side line up in the machine direction in three (3) positions across the cross direction of the specimens.	When individual rolls are tested, a strip six (6) inches wide is cut across the full width of the roll. On this strip, equally spaced from one end to the other, five (5) tests are made on the finish side and 5 tests are made on the wire side.	Samples used to represent a set of rolls are the same in number and are cut and tested in the same manner as samples representing a reel.
M	Six square-foot samples across reel, 3 pops up, 3 down on each sheet in cross direction.		
N		Five pops up and five pops down distributed evenly across full width roll strip.	
O	Sample is a strip 9 inches wide across the web. Ten determinations, 5 up and 5 down, are made at approx. equal intervals along the strip.	Sample is a strip 9 inches wide across the roll. Ten determinations, 5 up and 5 down, are made equally spaced across the roll.	

TABLE XIV

TEST PROPERTY: BURSTING STRENGTH
SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS

Part (a): Indicate below by checking appropriate line largest unit of production which is accepted for this test property for shipment or use without further testing.

Unit of Production	Mills														
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
One reel						√	√[c]		√	√		√	√		√
One roll	√	√	√				√[d]	√						√	
Other (describe)				√[a]	√[b]						√[e]				

[a] Could be any combination of reel size up to two 53" diameter sets of rolls.

[b] One roll and its counterpart from the next reel following.

[c] On 26-lb., 33-lb., and 38-lb. linerboard.

[d] On 42-lb., 47-lb., and 69-lb. linerboard.

[e] If average for car meets specifications, no further testing.

TABLE XV

TEST PROPERTY: BURSTING STRENGTH
SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS (Continued)

Part (b): Indicate below upper and/or lower acceptable average test values (for shipment or use) applicable to various grades for unit of production indicated in Part (a). (See Table XIV.)

	Mills																		
	A	B	C	D[a]	E	F	G	H	I	J		K	L	M	N	O			
26-lb. Grade																			
Finish	SF	Water	SF	--	SF	W	--	SF	WF	Std.	Steam	DF	S.F.L.	Water	SF	Spray			
Market Shipments:																			
Lower limit	60	60	60	65(55)	63	65	55	60	65	70	65	--	60	65	63	63			
Upper limit	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
For Intracompany Use:																			
Lower limit	60	60	60	65(55)	63	60	55	60	65	--	--	--	60	--	63	63			
Upper limit	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
33-lb. Grade																			
Finish	SF	water	SF	--	SF	w	Starch	SF	WF	Std.	Steam	WF	W.F.L.	Water	SF	Spray			
Market Shipments:																			
Lower limit	75	75	75	80(70)	75	75	75	75	85	75	70	75	75	75	75	79			
Upper limit	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
For Intracompany Use:																			
Lower limit	75	75	75	80(70)	75	70	75	75	85	--	--	--	75	--	75	79			
Upper limit	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
38-lb. Grade																			
Finish	WF	Water	WF	--	WF	S	Starch	WF	WF	Std.	Water	WF	W.F.L.	Water	WF	Spray	Dry	Water	
Market Shipments:																			
Lower limit	85	90	85	90(80)	85	85	85	85	95	85	80	90	85	85	85	91	91	92	
Upper limit	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
For Intracompany Use:																			
Lower limit	85	90	85	90(80)	85	80	85	85	95	--	--	--	85	--	85	91	91	92	
Upper limit	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
42-lb. Grade																			
Finish	WF	Water	WF	--	WF	S	Starch	WF	WF	Std.	Starch and Water	WF	W.F.L.	Std.	Starch and Water	WF	Spray	Dry	Water
Market Shipments:																			
Lower limit	100	100	100	100(90)	100	95	95	100	105	105	100	100	105	105	100	100	105	105	105
Upper limit	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
For Intracompany Use:																			
Lower limit	100	100	100	100(90)	100	90	95	100	105	--	--	--	105	--	--	100	105	105	105
Upper limit	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
47-lb. Grade																			
Finish	WF	Water	WF	--	WF	S	Starch	WF	WF	Std.	Starch	WF	W.F.L.	Std.	Starch	WF	Water		
Market Shipments:																			
Lower limit	105	105	105	105(90)	105	105	100	105	105	110	105	100	105	110	105	105	110		
Upper limit	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
For Intracompany Use:																			
Lower limit	105	105	105	105(90)	105	100	100	105	105	--	--	--	105	--	--	105	110		
Upper limit	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
69-lb. Grade																			
Finish	WF	Water	WF	--	WF	S	Starch	WF	WF	Std.	Starch and Water	WF	W.F.L.	Std.	Starch and Water	WF	Water		
Market Shipments:																			
Lower limit	135	135	135	135(120)	135	135	125	135	140	135+	135	135	135	135+	135	135	131		
Upper limit	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
For Intracompany Use:																			
Lower limit	135	135	135	135(120)	135	130	125	135	140	--	--	--	135	--	--	135	131		
Upper limit	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
90-lb. Grade																			
Finish	WF	--	WF	--	--	S	Note b	WF	WF[c]	Std.	Starch and Water	WF	W.F.L.	Std.	Starch and Water	--	Water		
Market Shipments:																			
Lower limit	150	--	150	165(140)	--	175		150		160+	160	165	160	160+	160	--	157		
Upper limit	--	--	--	--	--	--		--		--	--	--	--	--	--	--	--		
For Intracompany Use:																			
Lower limit	150	--	150	165(140)	--	170		150		--	--	--	160	--	--	--	157		
Upper limit	--	--	--	--	--	--		--		--	--	--	--	--	--	--	--		

[a] Reject the roll if average Mullen is below the "Standard for Averages" (lower limit). Reject the reel if more than 1/6 of the individual bursts (4 or more out of 20) are below the "Standard for the Individual Bursts" (figures in parentheses).

[b] None of this grade is produced.

[c] Laminated; stock rolls tested.

TABLE XVI

TEST PROPERTY: BURSTING STRENGTH
SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS (Continued)

Part (c): - If some units indicated in Part (a)--see Table XIV--are rejected as a unit without further testing, indicate below limiting average test values which do not cause rejection and which permit subdivision of Part (a) units for retesting.

		Mills										
		A[a]	B[a]	C[a]	D[a]	E[e]	F	G	H[a]	I	J	K[b]	L	M	N[e]	O
26-lb. Grade																
Finish							W	--		WF	Steam		S.F.L.	Water		--
Market Shipments:	Lower limit						60	50		--	60		60	60		--
	Upper limit						--	--		64	--		--	--		--
For Intracompany Use:	Lower limit						55	50		--	--		60	--		--
	Upper limit						--	--		64	--		--	--		--
33-lb. Grade																
Finish							W	--		WF	Steam		W.F.L.	Water		--
Market Shipments:	Lower limit						70	70		--	65		75	65		--
	Upper limit						--	--		84	--		--	--		--
For Intracompany Use:	Lower limit						65	--		--	--		75	--		--
	Upper limit						--	--		84	--		--	--		--
38-lb. Grade																
Finish							S	--		WF	Water		W.F.L.	Water		--
Market Shipments:	Lower limit						80	77		--	70		85	70		--
	Upper limit						--	--		94	--		--	--		--
For Intracompany Use:	Lower limit						75	--		--	--		85	--		--
	Upper limit						--	--		94	--		--	--		--
42-lb. Grade																
Finish							S	--		WF	Starch and Water		W.F.L.	Starch and Water		Water
Market Shipments:	Lower limit						90	90		--	90		100	90		100
	Upper limit						--	--		104	--		--	--		--
For Intracompany Use:	Lower limit						80	--		--	--		100	--		100
	Upper limit						--	--		104	--		--	--		--
47-lb. Grade																
Finish							S	--		WF	Starch		W.F.L.	Starch		--
Market Shipments:	Lower limit						100	90		--	95		100	95		--
	Upper limit						--	--		104	--		--	--		--
For Intracompany Use:	Lower limit						85	--		--	--		100	--		--
	Upper limit						--	--		104	--		--	--		--
69-lb. Grade																
Finish							S	--		WF	Starch and Water		W.F.L.	Starch and Water		--
Market Shipments:	Lower limit						130	115		--	125		135	125		--
	Upper limit						--	--		139	--		--	--		--
For Intracompany Use:	Lower limit						120	--		--	--		135	--		--
	Upper limit						--	--		139	--		--	--		--
90-lb. Grade																
Finish							S	Note c		Note d	Starch and Water		W.F.L.	Starch and Water		--
Market Shipments:	Lower limit						170				150		155	150		--
	Upper limit						--				--		--	--		--
For Intracompany Use:	Lower limit						160				--		155	--		--
	Upper limit						--				--		--	--		--

[a] No data.
[b] Same as Part (b).
[c] None of this grade is produced.
[d] Laminated; stock rolls tested.
[e] Part (c) omits, if rejected, are always retested; therefore, no values for Part (c).

TABLE XVII

TEST PROPERTY: BURSTING STRENGTH
SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS (Continued)

Part (d): Indicate below next largest unit of production which is accepted for this test property for shipment or use without further testing.

Unit of Production	Mills A[a]	B[a]	C[a]	D	E	F	G[c]	H[a]	I	J	K	L	M	N[a]	O
One set of rolls										X			X		
One roll					X	X					X[e]				X
Other (describe)				X[b]					X[d]			X[f]			

[a] Not applicable because unit already one roll.

[b] Could be any combination of reel size up to two 53" diameter sets of rolls.

[c] No data.

[d] Further test each roll.

[e] If board does not meet specifications, all the rolls are rechecked and any rolls that fail to meet specification in Part (b) of Section 7 are rejected.

[f] If retest is within specification, balance of reel is accepted. Balance of reel is usually 1-1/2 to 2-1/2 sets.

TABLE XVIII

TEST PROPERTY: BURSTING STRENGTH
SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS (Continued)

Part (e): Indicate below limiting average test values acceptable for shipment or use of unit of production-indicated in Part (d)--See Table XVII

	A[a]	B[a]	C[a]	D[b]	Mills E	F	G	H[a]	I	J	K[e]	L	M	N[a]	O
26-lb. Grade															
Finish					SF	W	--		WF	--		S.F.L.	--		Spray
Market Shipments: Lower limit					63	65	55		60	65		60	65		60
Upper limit					--	--	--		--	--		--	--		--
For Intracompany Use: Lower limit					63	60	--		60	--		60	--		60
Upper limit					--	--	--		--	--		--	--		--
33-lb. Grade															
Finish					SF	W	--		WF	--		W.F.L.	--		Spray
Market Shipment: Lower limit					75	75	75		80	70		75	70		75
Upper limit					--	--	--		--	--		--	--		--
For Intracompany Use: Lower limit					75	70	--		80	--		75	--		75
Upper limit					--	--	--		--	--		--	--		--
38-lb. Grade															
Finish					WF	S	--		WF	--		W.F.L.	--		Spray Dry Water
Market Shipments: Lower limit					85	85	85		90	80		85	80		87 87 87
Upper limit					--	--	--		--	--		--	--		-- -- --
For Intracompany Use: Lower limit					85	80	--		90	--		85	--		87 87 87
Upper limit					--	--	--		--	--		--	--		-- -- --
42-lb. Grade															
Finish					WF	S	--		WF	--		W.F.L.	--		Spray Dry Water
Market Shipment: Lower limit					100	95	95		100	100		100	100		100 100 100
Upper limit					--	--	--		--	--		--	--		-- -- --
For Intracompany Use: Lower limit					100	90	--		100	--		100	--		100 100 100
Upper limit					--	--	--		--	--		--	--		-- -- --
47-lb. Grade															
Finish					WF	S	--		WF	--		W.F.L.	--		Water
Market Shipments: Lower limit					105	105	100		100	105		100	105		105
Upper limit					--	--	--		--	--		--	--		--
For Intracompany Use: Lower limit					105	95	--		100	--		100	--		105
Upper limit					--	--	--		--	--		--	--		--
69-lb. Grade															
Finish					WF	S	--		WF	--		W.F.L.	--		Water
Market Shipment: Lower limit					135	135	125		135	135		135	135		125
Upper limit					--	--	--		--	--		--	--		--
For Intracompany Use: Lower limit					135	128	--		135	--		135	--		125
Upper limit					--	--	--		--	--		--	--		--
90-lb. Grade															
Finish					--	S	Note c		Note d	--		W.F.L.	--		Water
Market Shipments: Lower limit					--	175				160		155	160		150
Upper limit					--	--				--		--	--		--
For Intracompany Use: Lower limit					--	165				--		155	--		150
Upper limit					--	--				--		--	--		--

[a] Not applicable as Part (b) of Section 7 is already on the basis of single rolls.
[b] Same as Part (b).
[c] None of this grade is produced.
[d] Laminated; stock rolls tested.
[e] See Part (d).

TABLE XIX

TEST PROPERTY: BURSTING STRENGTH
SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS (Continued)

Mill	Part (f): Is acceptance or rejection of Part (d) units (see Table XVII) final on basis of original test for conformance with acceptance limits in Part (e)--see Table XVIII?	Part (g): If answer to Part (f) is "no", describe any additional procedure for retesting unaccepted product indcating who decides (1) whether or not retesting is to be performed and (2) how much retesting is done. Include information on any resampling required.
A	No	The "no" reply in Part (f) applies to Parts (a) and (b) of this section (7). Any roll strip not meeting the minimum bursting strength test is taken to the 70°F. - 50% R.H. room and immediately retested on the Mullen machine there; conditioned for two hours and tested again. Rejection is by paper mill supervision.
B	--	
C	No	The "no" reply in Part (f) applies to Parts (a) and (b) of this section (7). (1) Roll tester retests second sample unconditioned if below limits indicated in Part (a). (2) Shift operator retests third sample after conditioning at 73°F., 50% R.H.; and if below limits, roll is held for disposition by Paper Mill Superintendent.
D	Yes	
E	Yes	
F	No	(1) Quality Control Director. (2) Individual roll is slabbed down and retested.
G	No	Retesting on individual rolls performed on a second 6" strip across roll; 20 pops alternating up and down across roll.
H	No	The "no" reply in Part (f) applies to Parts (a) and (b) of this section (7). Rolls are resampled and retested in same way as original test. If still below acceptance limit, resampled and retested second time. Final acceptance or rejection is by paper mill supervision.
I	No	(1) Head tester decides. (2) See Part (b) of Section 6. Limits for retesting differ from original limits and are listed in Part (e) of this section (7).
J	No	Roll sampling. (1) Retest at order of tour foreman. (2) One recheck. Two samples per roll. Samples conditioned at least one hour before testing.
K	No	(1) Paper Mill Superintendent or Chief Chemist. (2) All rolls in car are rechecked and any rolls that fail to meet specifications in Part (b) of this section (7) are rejected.
L	Yes	
M	No	Roll sampling. (1) Retest at request of tour foreman. (2) One rechecked. Two samples per roll after one hour under room conditions.
N	Yes (Actually refers to units in Part b.)	
O	No	Tour foreman can ask for resampling and retest at any time. Acceptance is based on last average. Retesting is seldom requested. Sampling is identical to that described in Part (b) of Section 6.

PART III

COMPILATION OF REPLIES TO THE LINERBOARD QUALITY CONTROL QUESTIONNAIRES FOR THE TEST PROPERTY OF MOISTURE

Table Number	Subject
XX	Test instrument and calibration data
XXI	Conditioning data
XXII	Sampling data
XXIII	Acceptance limits. Part (a): Largest unit of production which is accepted for this test property (for shipment or use) without further testing.
XXIV	Acceptance limits. (Continued). Part (b): Upper and/or lower acceptable average test values (for shipment or use) applicable to various grades for unit of production indicated in Part (a).
XXV	Acceptance limits. (Continued). Part (c): If some units indicated in Part (a) are rejected as a unit without further testing, indicate below limiting average test values which do not cause rejection and which permit subdivision of Part (a) units for retesting.
XXVI	Acceptance limits. (Continued). Part (d): Next largest unit of production which is accepted for this test property (for shipment or use) without further testing.
XXVII	Acceptance limits. (Continued). Part (e): Limiting average test values acceptable for shipment or use of unit of production indicated in Part (d).
XXVIII	Acceptance limits. (Continued). Part (f): Is acceptance or rejection of Part (d) units final on basis of original test for conformance with acceptance limits in Part (e). Part (g): If answer to Part (f) is "no", describe any additional procedure for retesting unaccepted product.

TABLE XX

TEST PROPERTY: MOISTURE
TEST INSTRUMENT AND CALIBRATION DATA

Mill	(1) Name and Model of Test Instrument	(2) How Frequently are Paper Machine Control Test Instruments in Regular Use Calibrated?	(3) Describe Briefly Procedure Used for Calibrating or Standardizing Test Instruments and Their Key Components	(4) Instrument Calibration is Performed How Often by: (a) Testing Personnel	(b) Testing Supervisor	(c) Instrument Mechanic	(d) Other
A	Moisture Register - K2D	Once each 8-hour shift.	All testers are checked against a pad of board which is kept in machine room so that temperature and humidity of the test pad is the same as for tester operating conditions.	Once each 8 hours.	Once each month		
B	Hart Moisture Meter (clamp type)	Twice weekly.	Treated against conditioned sample of known moisture content as determined by oven check.	Twice weekly			
C	Emerson Speed Dryer Toledo Basis Weight Scale (Short Arm)	Once every 24 hours.	Emerson Speed Dryer: Surface temperature checked with pyrometer. Toledo Scales: Same procedure as used for basis weight scales.				Scales overhauled by factory serviceman every 6 months.
D	Hart Moisture Meter (Type K 103)	Monthly.	Hart meter is calibrated by testing conditioned samples and checking moisture in these same samples by oven method.		Monthly		
E	This company does not include moisture testing in its linerboard quality control program.						
F	Hart Moisture Meters equipped with static suppressors and voltage regulators.	Inspected and checked daily.	Three (3) meters in use are checked against each other weekly. Meter determinations are checked against oven determinations monthly.				Electronics engineers
G	Hart Moisture Meter (Clamp Type)	Weekly.	Tested against samples whose moisture content is determined by oven check	Weekly.			
H	Hart Moisture Meter (Battery operated model)	Checked once each shift; completely calibrated three times a week.	The sample clamp is checked for general condition and clamping pressure. The switches and push bottons are checked. The batteries--microammeter are calibrated, and the internal resistors are checked with standard resistors.		Once each shift.	Each week on Mon., Wed., and Fri.	

TABLE XI (Continued)

TEST PROPERTY: MOISTURE
TEST INSTRUMENT AND CALIBRATION DATA

Mill	(1) Name and Model of Test Instrument	(2) How Frequently are Paper Machine Control Test Instruments in Regular Use Calibrated?	(3) Describe Briefly Procedure Used for Calibrating or Standardizing Test Instruments and Their Key Components	(4) Instrument Calibration is Performed How Often by: (a) Testing Personnel	(b) Testing Supervisor	(c) Instrument Mechanic	(d) Other
I	Hart Moisture Meter K103 with static suppressor (2 in use) and Precision Scientific Co.'s electric oven (Catalog No. 1263)	When the Hart meter does not check the oven strip, the moisture scale is changed on the Hart meter.	Two strips are taken across each reel; one strip weighed on top of oven and then placed on balance pan suspended in the oven and dried 10 min. at 185°C. to constant wt. Ten spot checks are made across the reel with the Hart meter and averaged. This average should check within 0.3% of the oven moisture.	Every reel. Oven and Hart meter comparison.	Check oven temperature daily		
J	Toledo lab. scales, Model 4636; Oven, mechanical convection Freas No. 20702, Size 641.	Scales calibrated every 60 days (approx.)	Scales overhauled and checked by Toledo Service Man.	Before each test.	Once per 8-hr. shift.		Toledo Service Man every 60 days.
K	Infrared hot balance (made by mill)	Monthly	Check with standard weights.			Monthly	
L	Hart Model 25	Weekly	Checked against each other and against o.d. samples.				Paper Mill Chemist (weekly)
M	Toledo Basis Weight Scale, Model 9212; Freas forced circulation oven.	Three times per day	Scale is checked and adjusted, if necessary with standard check weights. Oven temperature is adjusted, if necessary		Three times per day.		
N	Lab. oven at 125°C.; torsion balance	Balance calibrated monthly	Balance is checked with standard weights.		Monthly.		
O	Forced draft oven - Precision Scientific Co., Model No. [illegible]; Balance, Mettler Instrument Co., Model [illegible]	Balance - three times per day.	Mettler balance is direct reading from 0-160 grams; it is checked for zero and 160-gram reading with 160 gram weight; range is then increased to 160-320 grams and 160 gram reading checked with 160 gram weight.		Three times per day.	Once per day.	
P	[illegible] continuous	Once each week and [illegible] to check	Instrument is calibrated against oven dried samples taken from several reels of production.				Stati[illegible] calib[illegible] once per week.

TABLE XXI

TEST PROPERTY: MOISTURE
SECTION 5 OF QUESTIONNAIRE: CONDITIONING DATA

Mill	(a) Are Board Acceptance Samples Conditioned Before Testing?	(b) If Samples are Conditioned, Describe Conditioning Procedure Briefly.	(c) Are Samples Tested Under Controlled Conditions of Temperature and Humidity?	(d) If Testing is Performed Under Controlled Conditions, Describe Conditions.
A	No (Time delay would be excessive for control purposes.		No	
B	No		Yes	70 ± 10°F.; 50% R. H. ± 10%.
C	No		No	
D	No		--	
E	This company does not include moisture testing in its linerboard quality control program.			
F	No		Yes	
G	No		No	
H	No		No	
I	No		No	
J	No		No	
K	No		Yes	In oven containing 150 watt infrared bulb.
L	No		No	
M	No		No	
N	No		Yes	220 ± 5°F.
O	No		No	
P	No (Time delay would be excessive for control purposes).			

TABLE XXXI

TEST PROPERTY: MOISTURE
SECTION 6 OF QUESTIONNAIRE: SAMPLING DATA

Mill	(a) Describe Form of Reel Sample, Number of Specimens per Reel Sample, Number of Measurements per Specimen, Distribution of Measurements Across Machine, and Orientation of Measurements with Respect to Specimens.	(b) If Roll Samples are Used, Supply Same Information for Them	(c) If Samples are Used to Represent Other Units of Product (Such as a Set of Rolls) Supply Same Information for Them.
A	With the "Moisture Register", the sampling is done on the reel. Twenty equally spaced checks are made across the width of the reel or any combination less than a reel if desired.		
B	Reel sampling. Six-inch strip taken across width of each reel. Fifteen individual readings made, spaced equally across reel. Figure listed on report represents reel average.		
C	Test sample is strip entire width of machine. Extra plies on top and bottom are taken to give protection to strip. One specimen (approx. one sq. ft.) is cut from each roll position for moisture test. Total specimens per reel three to six.		
D	Sample cutter checks a 2" strip across each reel and divides sample into front and back sections and checks moisture by oven method. The back tender cuts a strip about 6" wide and checks the moisture at 10 to 12 spots on the strip with Hart moisture meter on each reel.		
E	This company does not include moisture testing in its linerboard quality control program.		
F	One specimen--a strip approximately 6" wide--is cut from across the entire width of the reel. On this strip equally spaced from one end to the other, fifteen (15) determinations are made and recorded on a form showing their positions across the reel.	When individual rolls are tested, a strip approx. 6" wide is cut from across the full width of each roll and 5 determinations equally spaced are made along its full length. Testing on the individual roll basis is performed only when retesting becomes necessary, or the quality of a roll is questioned.	The specimen used to represent a set of rolls is cut, tested, and recorded in the same manner as the reel specimen.
G	A six-inch strip is taken across reel. Fifteen evenly spaced readings are taken across reel. High, low, and average reported.		
H	Several thicknesses of board are torn out at points equally spaced across the web. A single moisture measurement is made promptly on an interior sheet from each position, taking care to protect the specimens tested from exposure to the atmosphere except during the time the single thickness specimen is being transferred to the plane of the moisture meter.	Five small tear-outs consisting of several thicknesses of board are made equally spaced across the roll. Moisture is measured on a single specimen from each position taking the same precautions as those described in 6 (a).	

TABLE XXII (Continued)

TEST PROPERTY: MOISTURE
SECTION 6 OF QUESTIONNAIRE: SAMPLING DATA

Mill	(a) Describe Form of Reel Sample, Number of Specimens per Reel Sample, Number of Measurements per Specimen, Distribution of Measurements Across Machine, and Orientation of Measurements with Respect to Specimen.	(b) If Roll Samples are Used, Supply Same Information for Them	(c) If Samples are Used to Represent Other Units of Product (Such as a Set of Rolls) Supply Same Information for Them.
I	Two reel strip samples; one for electric oven, second strip across reel used in making 10 Hart Meter moisture tests across strip and averaged. This average compared to the oven test. Sample strip from each reel.	If Hart Meter shows any wet streaks, these rolls containing the wet streaks are rejected.	
J	Three-inch strip cut full width of reel. Complete strip used for oven moisture test; weighed first, tested by Hart meter, and then placed in oven. Every reel is tested for moisture content.	On roll examinations, the rolls are stripped down several laps and sample strips 3" wide are obtained for testing.	
K	Full width reel strip about 2" in machine direction. Entire strip used to gain a single gravimetric moisture reading.		
L	Ten individual tests across the machine on each reel.		
M	One strip, approx. 3" wide taken across entire width of each reel. Strip is weighed as a whole, then torn into three equal lengths which are weighed for front, middle, and back position moisture.	On roll examinations, the rolls are stripped down several laps and sample strips 3" wide are obtained for testing.	
N	Full width reel sample appox. 2" long in the machine direction. Entire strip used to gain single gravimetric moisture reading.		
O	Reel sample is 4-6" wide strip; three specimens taken from strip: F, C, and B across machine of equal length with edge trimmings at F and B torn off. This gives approx. 50 to 75 grams total wt. per specimen.	On roll examinations, the rolls are stripped down several laps and sample strips 3" wide are obtained for testing.	
P	Continuous scanning type: scans sheet every 3 minutes.		

TABLE XXIII

TEST PROPERTY: MOISTURE
SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS

Part (a): Indicate below by checking appropriate line largest unit of production which is accepted for this test property for shipment or use without further testing.

Unit of Production	Mills A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
One reel	X[a]	X	X	X	Note b	X	X	X	Note c	X	X	X	X		X	X[a]
One roll																
Other (describe)														2 Reels		

[a] Could be any combination of reel size up to two 53" diameter sets of rolls.

[b] This company does not include moisture testing in its linerboard quality control program.

[c] Wet streak located by Hart Meter.

TABLE XXIV

TEST PROPERTY: MOISTURE
SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS (Continued)

Part (b): Indicate below upper and/or lower acceptable average test values (for shipment or use) applicable to various grades for unit of production indicated in Part (a). (See Table XXIII.)

	A	B[b]		C[a]	D	E	F[e]	G		H		I	J[j]		K	L	M[j]		N	O[j]		P
								Mills														
26-lb. Grade																						
Finish		Std.	Steam	WF	DF		SFL	Std.	Water	Spray		Water	DF	SF	SF	W	DF	SF	SF	DF	SF	
Market Shipments:	Note					Note																
Lower limit	a	--	--	5.0(4.5)	4.0	f	--	--	--	3.6		5.0	--	--	4.0	5.5	--	--	4.0	--	--	a
Upper limit		5.5	6.0[c]	7.9(8.4)	7.5		8.0	5.5	6.0	7.2		7.5	6.0	6.0	7.5	6.5	6.0	6.0	7.5	6.0	6.0	
For Intracompany Use:																						
Lower limit		--	--	5.0(4.5)	--		--	--	--	Note h		5.0	--	--	4.0	5.0	--	--	4.0	--	--	
Upper limit		--	--	7.9(8.4)	--		8.0	--	--	Note h		7.5	6.0	6.0	7.5	7.5	6.0	6.0	7.5	6.0	6.0	
33-lb. Grade																						
Finish		Std.	Steam	WF	WF		WFL	Std.	Water	Spray		Water	DF	SF	SF	W	DF	SF	SF	DF	SF	
Market Shipments:																						
Lower limit		--	--	5.0(4.5)	4.0		--	--	--	3.6		5.0	--	--	4.0	5.5	--	--	4.0	--	--	
Upper limit		5.5	6.0[c]	7.9(8.4)	7.5		8.0	5.5	6.0	7.2		7.5	6.0	6.0	7.5	6.5	6.0	6.0	7.5	6.0	6.0	
For Intracompany Use:																						
Lower limit		--	--	5.0(4.5)	--		--	--	--	Note h		5.0	--	--	4.0	5.0	--	--	4.0	--	--	
Upper limit		--	--	7.9(8.4)	--		--	--	--	Note h		7.5	6.0	6.0	7.5	7.5	6.0	6.0	7.5	6.0	6.0	
38-lb. Grade																						
Finish		Std.	Water	WF	WF		WFL	Std.	Water	Spray	Dry	Water	Water		WF	WF	S		WF	WF	WF	
Market Shipments:																						
Lower limit		--	--	5.0(4.5)	4.0		--	--	--	3.6	3.3	3.6	5.0		--	4.0	5.5		--	4.0	--	
Upper limit		6.0	6.5[c]	7.9(8.4)	7.5		8.0	5.5	6.0	7.2	7.2	7.2	7.5		6.5	7.5	6.5		6.5	7.5	6.5	
For Intracompany Use:																						
Lower limit		--	--	5.0(4.5)	--		--	--	--	Note h			5.0		--	4.0	5.0		--	4.0	--	
Upper limit		--	--	7.9(8.4)	--		--	--	--	Note h			7.5		6.5	7.5	7.5		6.5	7.5	6.5	
42-lb. Grade																						
Finish		Std.	Starch and Water	WF	WF		WFL	Std.	Water and Starch	Spray	Dry	Water	Water		WF	WF	S		WF	WF	WF	
Market Shipments:																						
Lower limit		--	--	5.0(4.5)	4.0		--	--	--	3.6	3.3	3.6	5.0		--	4.0	5.5		--	4.0	--	
Upper limit		6.5	6.5[c]	7.9(8.4)	7.5		8.4(3.0)	6.0	6.5	7.2	7.2	7.2	7.5		6.5	7.5	6.5		6.5	7.5	6.5	
For Intracompany Use:																						
Lower limit				5.0(4.5)	--		--	--	--	Note h			5.0		--	4.0	5.0		--	4.0	--	
Upper limit				7.9(8.4)	--		8.4(3.0)	--	--	Note h			7.5		6.5	7.5	7.5		6.5	7.5	6.5	
47-lb. Grade																						
Finish		Std.	Starch	WF	WF		WFL	Std.	Starch			Water	Water		WF	WF	S		WF	WF	WF	
Market Shipments:																						
Lower limit		--	--	5.0(4.5)	4.0		4.3	--	--			3.6	5.0		--	4.0	5.5		--	4.0	--	
Upper limit		6.5	7.0[c]	7.9(8.4)	7.5		8.4	5.8	6.5			7.2	7.5		6.5	7.5	6.5		6.5	7.5	6.5	
For Intracompany Use:																						
Lower limit		--	--	5.0(4.5)	--		4.3	--	--			Note h	5.0		--	4.0	5.0		--	4.0	--	
Upper limit		--	--	7.9(8.4)	--		8.4	--	--			Note h	7.5		6.5	7.5	7.5		6.5	7.5	6.5	
69-lb. Grade																						
Finish		Std.	Starch and Water	WF	SWF		WFL	Std.	Water and Starch			Water	Water		WF	WF	S		WF	WF	WF	
Market Shipments:																						
Lower limit		--	--	5.0(4.5)	4.0		5.0	--	--			4.8	6.0		4.0	4.0	6.5		4.0	4.0	4.0	
Upper limit		7.5	8.0[d]	8.4(8.9)	8.0		9.0(3.0)	6.5	7.5			7.7	8.5		7.0	7.5	8.3		7.0	7.5	7.0	
For Intracompany Use:																						
Lower limit		--	--	5.0 (4.5)	--		5.0	--	--			Note h	6.0		4.0	4.0	6.5		4.0	4.0	4.0	
Upper limit		--	--	8.4(8.9)	--		9.0(3.0)	--	--			Note h	8.5		7.0	7.5	8.3		7.0	7.5	7.0	
90-lb. Grade																						
Finish		Std.	Starch and Water	WF	SWF		WFL	Std.	Water and Starch			Water	--		WF		S		WF		WF	
Market Shipments:																						
Lower limit		--	--	5.0(4.5)	4.0		5.0	--	--			5.3	--		4.0	Note i	6.5		4.0	Note i	4.0	
Upper limit		8.0	8.5[d]	8.4(8.9)	8.0		9.0(3.4)	7.0	8.0			8.2	--		7.5		8.3		7.5		7.5	
For Intracompany Use:																						
Lower limit		--	--	5.0(4.5)	--		5.0	--	--			Note h	--		4.0		6.5		4.0		4.0	
Upper limit		--	--	8.4(8.9)	--		9.0(3.4)	--	--			Note h	--		7.5		8.3		7.5		7.5	

[a] The desired moisture level for all grades is 5 to 8%. Any reel is rejected with a 16" wide high moisture band of 12% or above or any 40" band of 10% or above.

[b] Figures shown are Hart Meter readings which are guides for control. Due to flash of moisture in testing hot board direct from machine, actual moisture is higher than Hart Meter readings.

[c] Acceptable within these limits, provided range of individual tests within reel does not exceed 2%.

[d] Acceptable within these limits, provided range of individual tests within reel does not exceed 1%.

[e] Figures in parentheses are maximum or minimum values that may be included in reel average; % moisture = $\frac{\text{(wet weight - dry weight) x 100}}{\text{wet weight}}$

[f] This company does not include moisture testing in its linerboard quality control program.

[g] Figures in parentheses are the maximum variations within individual rolls. Rolls falling in positions across the reels that contain determinations outside the limits shown above, or rolls having variation in excess to that specified above are retested individually, and if the retest falls within these limits, the off-specification portion of the roll is rejected and the remainder accepted for shipment.

[h] This limit is the same as the corresponding limit for market shipments.

[i] None of this grade is produced.

[j] Ultimate rejection (or further examination) depends upon moisture level across reel--not just average.

TABLE XXV

TEST PROPERTY: MOISTURE
SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS (Continued)

Part (c): If some units indicated in Part (a)--see Table XXIII--are rejected as a unit without further testing, indicate below limiting average test values which do not cause rejection and which permit subdivision of Part (a) units for retesting.

	A[a]	B	C	D[a]	E[c]	F[d]	G	H	Mills I[f]	J	K[e]	L	M[e]	N[e]	O[g]	P
26-lb. Grade																
Finish		Steam	WF			--				DF	SF	W	DF	SF	DF	SF	
Market Shipments: Lower limit		--	4.5			--	See			--	--	4.5	--	--	--	--	Note
Upper limit		6.0	8.4			6.0	Part			7.0	7.0	8.0	7.0	7.0	7.0	7.0	b
For Intracompany Use: Lower limit		--	4.5			--	(b)			--	--	4.5	--	--	--	--	
Upper limit		--	8.4			--				7.0	7.0	8.0	7.0	7.0	7.0	7.0	
33-lb. Grade																
Finish		Steam	WF			--				DF	SF	W	DF	SF	DF	SF	
Market Shipments: Lower limit		--	4.5			--				--	--	4.5	--	--	--	--	
Upper limit		6.0	8.4			6.0				7.0	7.0	8.0	7.0	7.0	7.0	7.0	
For Intracompany Use: Lower limit		--	4.5			--				--	--	4.5	--	--	--	--	
Upper limit		--	8.4			--				7.0	7.0	8.0	7.0	7.0	7.0	7.0	
38-lb. Grade																
Finish		Water	WF			--				WF		S	WF		WF		
Market Shipments: Lower limit		--	4.5			--				--		4.5	--		--		
Upper limit		6.5	8.4			6.0				7.5		8.0	7.5		7.5		
For Intracompany Use: Lower limit		--	4.5			--				--		4.5	--		--		
Upper limit		--	8.4			--				7.5		8.0	7.5		7.5		
42-lb. Grade																
Finish		Starch and Water	WF			--				WF		S	WF		WF		
Market Shipments: Lower limit		--	4.5			--				--		4.5	--		--		
Upper limit		6.5	8.4			6.5				7.5		8.0	7.5		7.5		
For Intracompany Use: Lower limit		--	4.5			--				--		4.5	--		--		
Upper limit		--	8.4			--				7.5		8.0	7.5		7.5		
47-lb. Grade																
Finish		Starch	WF			--				WF		S	WF		WF		
Market Shipments: Lower limit		--	4.5			--				--		4.5	--		--		
Upper limit		7.0	8.4			6.5				7.5		8.0	7.5		7.5		
For Intracompany Use: Lower limit		--	4.5			--				--		4.5	--		--		
Upper limit		--	8.4			--				7.5		8.0	7.5		7.5		
69-lb. Grade																
Finish		Starch and Water	WF			--				WF		S	WF		WF		
Market Shipments: Lower limit		--	4.5			--				4.0		5.5	4.0		4.0		
Upper limit		8.0	8.9			7.5				8.5		9.0	8.5		8.5		
For Intracompany Use: Lower limit		--	4.5			--				4.0		5.5	4.0		4.0		
Upper limit		--	8.9			--				8.5		9.0	8.5		8.5		
90-lb. Grade																
Finish		Starch and Water	WF			--				WF		S	WF		WF		
Market Shipments: Lower limit		--	4.5			--				4.0		5.5	4.0		4.0		
Upper limit		8.5	8.9			8.0				9.0		9.0	9.0		9.0		
For Intracompany Use: Lower limit		--	4.5			--				4.0		5.5	4.0		4.0		
Upper limit		--	8.9			--				9.0		9.0	9.0		9.0		

[a] Same as Part (b).

[b] Same as Part (b). All rechecks are performed with a portable "Moisture Register" moisture tester.

[c] This company does not include moisture testing in its linerboard quality control program.

[d] Rolls falling in positions across the reels that contain determinations outside the limits shown above, or rolls having variation in excess to that specified above are retested individually and if the retest falls within these limits, the off specification portion of the roll is rejected and the remainder accepted for shipment.

[e] Part (a) units, if rejected, are always retested; therefore, no values for Part (c).

[f] No data.

[g] Examination for rejection depends upon moisture level across reel.

TABLE XXVI

TEST PROPERTY: MOISTURE
SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS

Part (d): Indicate below next largest unit of production which is accepted for this test property for shipment or use without further testing.

Unit of Production	Mills A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
One set of rolls		X			No moisture testing is done	See Part (c)	X		No data		X	X		X[d]		
One roll				X[c]				X		X			X		X	
Other (describe)	X[a]		X[b]													X[a]

[a] Could be any combination of reel size up to two 55" dia. sets of rolls.

[b] Set of rolls less the roll or rolls below test. All other rolls in reel in same roll position as good rolls would also be accepted.

[c] If the moisture is high or low for the reel, the individual rolls are checked by Hart Meter. The rejected rolls are repulped.

[d] Not applicable because unit already one roll.

TABLE XXVII

TEST PROPERTY: MOISTURE
SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS (Continued)

Part (e): Indicate below limiting average test values acceptable for shipment or use of unit of production indicated in Part (d)--See Table XXVI.

	A	B	C	D	E	F	Mills G	H	I	J	K	L	M[e]	N	O[e]	P
26-lb. Grade																
Finish		Steam	--	See	No	See	--	Spray		DF SF		W	DF SF		DF SF	
Market Shipment:	Note			Part	mois-	Part			Note		Note			Note		Note
Lower limit	a	--	5.0	(d).	ture	(c).	--	3.3	d	-- --	a	4.5	-- --	a	-- --	b.
Upper limit		6.0	7.9		testing		6.0	7.5		6.5 6.5		8.0	6.5 6.5		6.5 6.5	
For Intracompany Use:					done.											
Lower limit		--	5.0				--	Note c		-- --		4.5	-- --		-- --	
Upper limit		--	7.9				--	Note c		6.5 6.5		8.0	6.5 6.5		6.5 6.5	
33-lb. Grade																
Finish		Steam	--				--	Spray		DF SF		W	DF SF		DF SF	
Market Shipment: Lower limit		--	5.0				--	3.3		-- --		4.5	-- --		-- --	
Upper limit		6.0	7.9				6.0	7.5		6.5 6.5		8.0	6.5 6.5		6.5 6.5	
For Intracompany Use:																
Lower limit		--	5.0				--	Note c		-- --		4.5	-- --		-- --	
Upper limit		--	7.9				--	Note c		6.5 6.5		8.0	6.5 6.5		6.5 6.5	
38-lb. Grade																
Finish		Water	--				--	Dry Water Spray		WF		S	WF		WF	
Market Shipment:																
Lower limit		--	5.0				--	3.0 3.3 3.3		--		4.5	--		--	
Upper limit		6.0	7.9				6.0	7.5 7.5 7.5		7.0		8.0	7.0		7.0	
For Intracompany Use:																
Lower limit		--	5.0				--	Note c		--		4.5	--		--	
Upper limit		--	7.9				--	Note c		7.0		8.0	7.0		7.0	
42-lb. Grade																
Finish		Starch and Water	--				--	Dry Water		WF		S	WF		WF	
Market Shipment:																
Lower limit		--	5.0				--	3.0 3.3		--		4.5	--		--	
Upper limit		6.5	7.9				6.5	7.5 7.5		7.0		8.0	7.0		7.0	
For Intracompany Use:																
Lower limit		--	5.0				--	Note c		--		4.5	--		--	
Upper limit		--	7.9				--	Note c		7.0		8.0	7.0		7.0	
47-lb. Grade																
Finish		Starch	--				--	Water		WF		S	WF		WF	
Market Shipment:																
Lower limit		--	5.0				--	3.3		--		4.5	--		--	
Upper limit		7.0	7.9				6.5	7.5		7.0		8.0	7.0		7.0	
For Intracompany Use:																
Lower limit		--	5.0				--	Note c		--		4.5	--		--	
Upper limit		--	7.9				--	Note c		7.0		8.0	7.0		7.0	
69-lb. Grade																
Finish		Starch and Water	--				--	Water		WF		S	WF		WF	
Market Shipment:																
Lower limit		--	5.0				--	4.5		4.0		5.5	4.0		4.0	
Upper limit		8.0	8.4				7.5	8.0		7.5		9.0	7.5		7.5	
For Intracompany Use:																
Lower limit		--	5.0				--	Note c		4.0		5.5	4.0		4.0	
Upper limit		--	8.4				--	Note c		7.5		9.0	7.5		7.5	
90-lb. Grade																
Finish		Starch and Water	--				--	water		WF		S	WF		WF	
Market Shipment:																
Lower limit		--	5.0				--	5.0		4.0		5.5	4.0		4.0	
Upper limit		8.5	8.4				8.0	8.5		8.0		9.0	8.0		8.0	
For Intracompany Use:																
Lower limit		--	5.0				--	Note c		4.0		5.5	4.0		4.0	
Upper limit		--	8.4				--	Note c		8.0		9.0	8.0		8.0	

[a] Same as Part (b).

[b] Same as Part (b). All rechecks are performed with a portable "Moisture Register" moisture tester.

[c] This limit is the same as the corresponding limit for market shipments.

[d] No data.

[e] Rejection again depends upon uniformity of moisture.

TABLE XXVIII

TEST PROPERTY: MOISTURE
SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS (Continued)

Mill	Part (f): Is acceptance or rejection of Part (d) units (see Table XXVI) final on basis of original test for conformance with acceptance limits in Part (e)--see Table XXVII?	Part (g): If answer to Part (f) is "no", describe any additional procedure for retesting unaccepted product indicating who decides (1) whether or not retesting is to be performed and (2) how much retesting is done. Include information on any resampling required.
A	Yes	
B	No	Roll sampling at direction of Tour Foreman. Roll cut down six laps. Six-inch strip taken across width of roll and immediately tested.
C	No	A second sample is obtained from roll. Average of retest and original test must meet specification limits of Part (b) of the Acceptance Limits section.
D	No	See footnote in Part (d). The superintendent or assistant superintent or tour foreman decides amount of testing to be done.
E	--	
F	--	
G	--	
H	No	Tour foreman can ask for resampling and retest at any time. Acceptance is based on last test average. Retesting is seldom requested. The sampling is identical to Part (b) of Section 6 (See Table XXII).
I	--	
J	No	Paper Mill Superintendent may reject roll meeting stipulations because of of wet streaks, etc.; occasional requests for roll retests require resampling of roll.
K	Yes	
L	No	(1) Quality Control Director; (2) rolls are slabbed down and retested.
M	No	Same as Mill J.
N	Yes	
O	No	Same as Mill J.
P	Yes	

PART IV

COMPILATION OF REPLIES TO THE LINERBOARD

QUALITY CONTROL QUESTIONNAIRES

FOR

MISCELLANEOUS TEST PROPERTIES

Size
Brightness
Mottle Number
Vanceometer
Caliper

Table Number	Subject
XXIX	Test instrument and calibration data
XXX	Conditioning data
XXXI	Sampling data
XXXII	Acceptance limits. Part (a): Largest unit of production which is accepted for this test property (for shipment or use) without further testing.
XXXIII	Acceptance limits. (Continued). Part (b): Upper and/or lower acceptable average test values (for shipment or use) applicable to various grades for unit of production indicated in Part (a).
XXXIV	Acceptance limits. (Continued). Part (c): If some units indicated in Part (a) are rejected as a unit without further testing, indicate below limiting average test values which do not cause rejection and which permit subdivision of Part (a) units for retesting.
XXXV	Acceptance limits. (Continued). Part (d): Next largest unit of production which is accepted for this test property (for shipment or use) without further testing.
XXXVI	Acceptance limits. (Continued). Part (e): Limiting average test values acceptable for shipment or use of unit of production indicated in Part (d).
XXXVII	Acceptance limits (Continued). Part (f): Is acceptance or rejection of Part (d) units final on basis of original test for conformance with acceptance limits in Part (e). Part (g): If answer to Part (f) is "no", describe any additional procedure for retesting unaccepted product.

TABLE XXIX

MISCELLANEOUS TEST PROPERTIES
TEST INSTRUMENT AND CALIBRATION DATA

(1) Name and Model of Test Instrument	(2) How Frequently are Paper Machine Control Test Instruments in Regular Use Calibrated?	(3) Describe Briefly Procedure Used for Calibrating or Standardizing Test Instruments and Their Key Components	(4) Instrument Calibration is Performed How Often by: (a) Testing Personnel	(b) Testing Supervisor	(c) Instrument Mechanic	(d) Other
Name of Test Property: Size						
C August Sauter KG Balance, 0-2 Gm. Scale (Max. capacity: 500 Gm.) As specified by TAPPI.	Balance checked every 24 hours	Balance checked with standard weights and adjusted when necessary.			Once every 24 hours.	
F Ink Flotation (Carter's ink 95% -HCl 5%) Petri dish and stop watch	No calibration necessary.	Ink solution in Petri dish is changed every four (4) hours.				
F Cobb (As described in TAPPI Method T 441-m45.	No calibration needed.	None				
Name of Test Property: Brightness						
C Luke Research Laboratory (Alinco) Model 50)	Once every 24 hours.	Standard plates are calibrated by G. E. Brightness meter. Instrument is adjusted to read same value on std. plate as G. E. meter. This is a simple adjustment performed when necessary before each set of tests.	As necessary		Once per 24 hours.	
Name of Test Property: Mottle Number						
C Panel consisting of 5 sheets rated 1, 2, 3, 4, and 5. 1, no mottle; 5, high mottle.	No calibration needed.	Comparative test.				
Name of Test Property: Moisture Streaks						
R Hart Moisture Meter Battery-operated model.	Once every shift--checked; three times a week--completely calibrated.	The sample clamp is checked for general condition and clamping pressure. The switches and push buttons are checked. The batteries, microammeter are calibrated, and the internal resistors are checked with std. resistors.		Once each shift	Three times per week; Mon., Wed., and Fri.	

TABLE XXIX (Continued)

MISCELLANEOUS TEST PROPERTIES
TEST INSTRUMENT AND CALIBRATION DATA

Mill	(1) Name and Model of Test Instrument	(2) How Frequently are Paper Machine Control Test Instruments in Regular Use Calibrated?	(3) Describe Briefly Procedure Used for Calibrating or Standardizing Test Instruments and Their Key Components	(4) Instrument Calibration is Performed How Often by: (a) Testing Personnel	(b) Testing Supervisor	(c) Instrument Mechanic	(d) Other
			Name of Test Property: Vancometer				
K	The Vancometer	Daily	Check 2 points on scale in addition to 0 by means of reflective glass plates standardized.	Daily			
Y	The Vancometer	Daily	Check 2 points on scale in addition to 0 by means of reflective glass plates standardized.	Once per shift	Once per day		
			Name of Test Property: Caliper				
I	E. J. Cady Micrometer (old type model) (6 in use.)	Use feeler gage to check instrument once a month.	Use feeler gage to check instrument; also check daily for zero calibrating.	Each shift zero adjusted	Once a month		

TABLE XXX

MISCELLANEOUS TEST PROPERTIES
SECTION 5 OF QUESTIONNAIRE: CONDITIONING DATA

Mill	(a) Are Board Acceptance Samples Conditioned Before Testing?	(b) If Samples are Conditioned, Describe Conditioning Procedure Briefly.	(c) Are Samples Tested Under Controlled Conditions of Temperature and Humidity?	(d) If Testing is Performed Under Controlled Conditions, Describe Conditions.
		Name of Test Property: Size		
C	No		Yes	73 ± 2°F.; 50% ± 2% Relative Humidity.
F	No		Yes	73 ± 3°F.; 50% ± 3% relative humidity.
H	No		Yes	72 ± 3°F.; 50% ± 2% relative humidity.
		Name of Test Property: Brightness		
C	No		No	
		Name of Test Property: Mottle Number		
C	No		No	
		Name of Test Property: Moisture Stresks		
H	No		No	
		Name of Test Property: Vanceometer		
K	No		Yes	73 ± 2°F.; 50% ± 2% relative humidity
M	No		No	
		Name of Test Property: Caliper		
I	No	Cut-turn samples spot checked the following day; three samples per 8 hours per machine are calipered and compared to caliper at time of manufacture.	Yes	73 ± 3.5°F.; 50% ± 2% relative humidity.

TABLE XXXI

MISCELLANEOUS TEST PROPERTIES
SECTION 6 OF QUESTIONNAIRE: SAMPLING DATA

Mill	(a) Describe Form of Reel Sample, Number of Specimens per Reel Sample, Number of Measurements per Specimen, Distribution of Measurements Across Machine, and Orientation of Measurements with Respect to Specimens.	(b) If Roll Samples are Used, Supply Same Information for Them	(c) If Samples are Used to Represent Other Units of Product (Such as a Set of Rolls) Supply Same Information for Them
	Name of Test Property: Size		
C	Reel sample consists of two sheets 6" x 6" chosen at random. One test is made on each sheet; one top side, one bottom side. Two-minute contact time.		
F	One, 1 sq. in. specimen is taken from the top-center of each reel. This specimen is floated flat, wire side up, in a solution of Carter's ink. The time required for the ink solution to penetrate evenly to the upper surface is recorded in minutes and seconds.	Roll samples are not used. All testing is done on a reel or set basis.	As on a reel, one specimen is used to represent a set of rolls and is collected, tested, and recorded in the same manner.
H	One determination is made on every third reel. The specimen is obtained from the back center of the web. Cobb size is measured on the bottom side only.	Four specimens are obtained equally spaced across the roll. Cobb size is measured on the bottom side of each.	
	Name of Test Property: Brightness		
C	Strip is obtained width of machine. Ten readings obtained on finished side spaced across width of machine.		
	Name of Test Property: Mottle Number		
C	One square-foot sample is taken from each roll position. Total samples 3 to 6 per reel.		
	Name of Test Property: Moisture Streaks		
H	Several thicknesses of board are torn out at points equally spaced across the web. A single moisture measurement is made promptly on an interior sheet from each position, taking care to protect the specimens tested from exposure to the atmosphere except during the time the single-thickness specimen is being transferred to the clamp of the moisture meter.	Five small tear-outs consisting of several thicknesses of board are made equally spaced across the roll. Moisture is measured on a single specimen from each position taking the same precautions as those described in Part (a).	

TABLE XXXI (Continued)

MISCELLANEOUS TEST PROPERTIES
SECTION 6 OF QUESTIONNAIRE: SAMPLING DATA

(a) Describe Form of Reel Sample, Number of Specimens per Reel Sample, Number of Measurements per Specimen, Distribution of Measurements Across Machine, and Orientation of Measurements with Respect to Specimens.	(b) If Roll Samples are Used, Supply Same Information for Them	(c) If Samples are Used to Represent Other Units of Product (Such as a Set of Rolls) Supply Same Information for Them
Name of Test Property: Vancometer		
One 6 x 12 sample taken at random across the width of the machine.		
Two 6 x 12 specimens selected from every other reel, first in the front position, then from the center, then from the back, repeating in that order.		
Name of Test Property: Caliper		
Each roll leaving the winder is calipered. Three checks on each sample.		

TABLE XXXII

MISCELLANEOUS TEST PROPERTIES
SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS

Part (a): Indicate below by checking appropriate line largest unit of production which is accepted for this test property for shipment or use without further testing.

Unit of Production	Test Property: Size Mills C	F	H	Test Property: Brightness Mill C	Test Property: Mottle Number Mill C	Test Property: Moisture Streaks Mill H	Test Property: Vanceometer Mill K	Mill N	Test Property: Caliper Mill I
One reel	X	X	X	X	X	X			
One roll									
Other							X (2 reels)	X (4 reels)	Note a

[a] Caliper 1 sq. ft. sample at three spots; test averaged.

TABLE XXXIII

MISCELLANEOUS TEST PROPERTIES
SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS (Continued)

Part (b): Indicate below upper and/or lower acceptable average test values (for shipment or use) applicable to various grades for unit-of-production indicated in Part (a). (See Table XXXII).

	Test Property: Size Mills			Test Property: Brightness	Test Property: Mottle Number	Test Property: Moisture Streaks	Test Property:	Test Property: Vancometer	Test Property: Caliper
	C	FC	Hd	Mill C	Mill C	Mill H[f]	Mill N	Mill N	Mill I
26-lb. Grade									
Finish	WF	S.F.L.	Spray	--	--	--	--	--	Water
Market Shipments:									
Lower limit	--	1	--	--	--	--	--	--	0.008
Upper limit	100[a]	4	0.96	--	--	--	--	--	0.009
For Intracompany Use:									
Lower limit	--	1	--	--	--	--	--	--	0.008
Upper limit	100[a]	4	--	--	--	--	--	--	0.009
33-lb. Grade									
Finish	WF	W.F.L.	Spray	WF	WF	--	--	--	Water
Market Shipments:									
Lower limit	--	1	--	20.0[e]	--	--	--	--	0.009
Upper limit	100[a]	4	0.96	23.0[e]	3	--	--	--	0.011
For Intracompany Use:									
Lower limit	--	1	--	20.0	--	--	--	--	0.009
Upper limit	100[a]	4	--	23.0	3	--	--	--	0.011
38-lb. Grade									
Finish	WF	W.F.L.	Spray Water	WF	WF	Water	WF	WF	Water
Market Shipments:									
Lower limit	--	1	-- --	20.0[e]	--	--	40	40	0.011
Upper limit	100[a]	5	0.96 0.96	23.0[e]	3	8.0	--	--	0.012
For Intracompany Use:									
Lower limit	--	1	-- --	20.0	--	--	40	40	0.011
Upper limit	100[a]	5	-- --	23.0	3	8.0	--	--	0.012
42-lb. Grade									
Finish	WF	W.F.L.	Spray Water	WF	WF	Water	WF	WF	Water
Market Shipments:									
Lower limit	--	1	-- --	20.0[e]	--	--	40	40	0.012
Upper limit	100[a]	5	0.96 0.96	23.0[e]	3	8.0	--	--	0.013
For Intracompany Use:									
Lower limit	--	1	-- --	20.0	--	--	40	40	0.012
Upper limit	100[a]	5	-- --	23.0	3	8.0	--	--	0.013
47-lb. Grade									
Finish	WF	W.F.L.	Water	WF	WF	Water	--	--	Water
Market Shipments:									
Lower limit	--	1	--	20.0[e]	--	--	--	--	0.0135
Upper limit	100[a]	5	0.96	23.0[e]	3	8.0	--	--	0.0145
For Intracompany Use:									
Lower limit	--	1	--	20.0	--	--	--	--	0.0135
Upper limit	100[a]	5	--	23.0	3	8.0	--	--	0.0145
69-lb. Grade									
Finish	WF	W.F.L.	Water	WF	WF	Water	--	--	Water
Market Shipments:									
Lower limit	--	2	--	20.0[e]	--	--	--	--	0.019
Upper limit	100[a]	8	0.96	23.0[e]	3	8.5	--	--	0.021
For Intracompany Use:									
Lower limit	--	2	--	20.0	--	--	--	--	0.019
Upper limit	100[a]	8	--	23.0	3	8.5	--	--	0.021
90-lb. Grade									
Finish	WF[b]	W.F.L.	Water	--	WF	Water	--	--	--
Market Shipments:									
Lower limit	--	4	--	--	--	--	--	--	--
Upper limit	--	8	0.96	--	3	9.0	--	--	--
For Intracompany Use:									
Lower limit	--	4	--	--	--	--	--	--	--
Upper limit	--	8	--	--	3	9.0	--	--	--

[a] Bottom side.

[b] Laminate: base stock tested.

[c] Units of this test are "minutes"; limits for market and intracompany shipments are the same. If sample exceeds upper control limit, it is not rejected.

[d] There are no lower limits. Upper limits are the same for both market shipments and intracompany use.

[e] On superliner grades only.

[f] Indicated acceptance values are applicable to individual test values--not to averages. There are no lower limits. Upper limits are the same for both market shipments and intracompany use.

TABLE XXXIV

MISCELLANEOUS TEST PROPERTIES
SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS (Continued)

Part (c): If some units indicated in Part (a)--see Table XXXII--are rejected as a unit without further testing, indicate below limiting *average test values* which do not cause rejection and which permit subdivision of Part (a) units for retesting.

	Test Property: Mills C[a]	Test Property: Mills F[b]	Test Property: Mills H[a]	Test Property: Brightness Mill C[a]	Test Property: Mottle Number Mill C[a]	Test Property: Moisture Streaks Mill H[a]	Test Property: Mill N[c]	Test Property: Vanceometer Mill K[c]	Test Property: Caliper Mill J[b]
26-lb. Grade									
Finish	S.F.L.								
Market Shipments:									
Lower limit	1								
Upper limit	--								
For Intracompany Use:									
Lower limit	--								
Upper limit	--								
33-lb. Grade									
Finish	W.F.L.								
Market Shipments:									
Lower limit	1								
Upper limit	--								
For Intracompany Use:									
Lower limit	--								
Upper limit	--								
38-lb. Grade									
Finish	W.F.L.								
Market Shipments:									
Lower limit	1								
Upper limit	--								
For Intracompany Use:									
Lower limit	--								
Upper limit	--								
42-lb. Grade									
Finish	W.F.L.								
Market Shipments:									
Lower limit	1								
Upper limit	--								
For Intracompany Use:									
Lower limit	--								
Upper limit	--								
47-lb. Grade									
Finish	W.F.L.								
Market Shipments:									
Lower limit	1								
Upper limit	--								
For Intracompany Use:									
Lower limit	--								
Upper limit	--								
69-lb. Grade									
Finish	W.F.L.								
Market Shipments:									
Lower limit	2								
Upper limit	--								
For Intracompany Use:									
Lower limit	--								
Upper limit	--								
90-lb. Grade									
Finish	W.F.L.								
Market Shipments:									
Lower limit	4								
Upper limit	--								
For Intracompany Use:									
Lower limit	--								
Upper limit	--								

[a] Does not apply.

[b] Units of this test are "minutes".

[c] Part (a) units, if rejected, are always retested; therefore, no values for Part (c).

[d] No data.

TABLE XXXV

MISCELLANEOUS TEST PROPERTIES
SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS (Continued)

Part (d): Indicate below next largest unit of production which is accepted for this test property for shipment or use without further testing.

Unit of Production	Test Property: Size, Mills C	Mills F	Mills H	Test Property: Brightness, Mill C	Test Property: Mottle Number, Mill C	Test Property: Moisture Streaks, Mill H	Test Property: Vanceometer, Mill K	Vanceometer, Mill N	Test Property: Caliper, Mill I
One set of rolls									
One roll			X			X		X	
Other (describe)	X[a]	X[b]		X[c]	X[d]		X[e]		No data

[a] Retest is same as original test. Retest must meet specification.

[b] When the size test in a reel is below the limits shown above, the reel is run off on the winder in 1/2 set units and is retested and rejected until the test level that is within specification is reached. The balance of the reel is then accepted.

[c] Does not apply.

[d] "Good" rolls are accepted. Also, all other rolls in same position in reel are accepted.

[e] Part (a) units, (if rejected) are always retested; therefore, no values for table below.

TABLE XXXVI

MISCELLANEOUS TEST PROPERTIES
SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS (Continued)

Part (e):--Indicate below limiting average test values acceptable for shipment or use of unit of production indicated in Part (d)--See Table XXXV.

	Test Property: Size Mills C[a] F[b] H[c]	Test Property: Brightness Mill C[a]	Test Property: Mottle Number Mill C	Test Property: Moisture Streaks Mill H[c,d]	Test Property: Mill N	Vancometer Mill K	Test Property: Caliper Mill I[e]
Finish	Spray		26-lb. Grade				
Market Shipments:			--	--	--	--	
Lower limit	--						
Upper limit	1.00		--	--	--	--	
For Intracompany Use:			--	--	--	--	
Lower limit	--						
Upper limit	--		--	--	--	--	
			--	--	--	--	
Finish	Spray		33-lb. Grade				
Market Shipments:			WF	--	--	--	
Lower limit	--						
Upper limit	1.00		--	--	--	--	
For Intracompany Use:			3	--	--	--	
Lower limit	--						
Upper limit	--		--	--	--	--	
			3	--	--	--	
Finish	Spray Water		38-lb. Grade				
Market Shipments:			WF	Water	WF	WF	
Lower limit	-- --						
Upper limit	1.00 1.00		--	--	40	40	
For Intracompany Use:			3	8.0	--	--	
Lower limit	-- --						
Upper limit	-- --		--	--	40	40	
			3	8.0	--	--	
Finish	Spray Water		42-lb. Grade				
Market Shipments:			WF	Water	WF	WF	
Lower limit	-- --						
Upper limit	1.00 1.00		--	--	40	40	
For Intracompany Use:			3	8.0	--	--	
Lower limit	-- --						
Upper limit	-- --		--	--	40	40	
			3	8.0	--	--	
Finish	Water		47-lb. Grade				
Market Shipments:			WF	Water	--	--	
Lower limit	--						
Upper limit	1.00		--	--	--	--	
For Intracompany Use:			3	8.0	--	--	
Lower limit	--						
Upper limit	--		--	--	--	--	
			3	8.0	--	--	
Finish	Water		69-lb. Grade				
Market Shipments:			WF	Water	--	--	
Lower limit	--						
Upper limit	1.00		--	--	--	--	
For Intracompany Use:			3	8.5	--	--	
Lower limit	--						
Upper limit	--		--	--	--	--	
			3	8.5	--	--	
			90-lb. Grade				
Finish	Water		--	Water	--	--	
Market Shipments:							
Lower limit	--						
Upper limit	1.00		--	--	--	--	
For Intracompany Use:			--	9.0	--	--	
Lower limit	--						
Upper limit	--		--	--	--	--	
			--	9.0	--	--	

[a] Does not apply.

[b] Same as Part (c).

[c] There are no lower limits. Upper limits are the same for both market shipments and intracompany use.

[d] Limits given in this table apply to individual test values--not to averages.

[e] No data.

TABEL XXXVII

MISCELLANEOUS TEST PROPERTIES
SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS (Continued)

	Part (f): Is acceptance or rejection of Part (d) units (see Table XXXV) final on basis of original test for conformance with acceptance limits in Part (e)—see Table XXXVI?	Part (g): If answer to Part (f) is "no", describe any additional procedure for retesting unaccepted product indicating who decides (1) whether or not retesting is to be performed and (2) how much retesting is done. Include information on any resampling required.
Test Property: Size		
Mill C	No	Retest is same as original test. Retest must meet specification.
Mill F	See Part (d).	
Mill H	No	Tour foreman can ask for resampling and retest any time. Acceptance is based on last results. Retesting is seldom requested. The sampling is identical to Part (b) of Section 6.
Test Property: Brightness		
Mill C	No	(1) Head tester. (2) Strip is obtained from each roll. Five determinations made. Retest must be within specification.
Test Property: Mottle Number		
Mill C	No	Retest is performed in same manner as original test. Retest must be within specification.
Test Property: Moisture Streaks		
Mill E	Yes	
Test Property: Vancecmeter		
Mill K	Yes	
Mill F	Yes	
Test Property: Caliper		
Mill I	—	

APPENDIX

SUPPLEMENTARY COMPILATION OF REPLIES TO THE LINERBOARD QUALITY CONTROL QUESTIONNAIRES FOR MILLS Q AND R

Table Number	Subject
XXXVIII	Test properties having acceptance limits
XXXIX	Test instrument and calibration data
XL	Conditioning data
XLI	Sampling data
XLII	Acceptance limits. Part (a): Largest unit of production which is accepted for this test property (for shipment or use) without further testing.
XLIII	Acceptance limits. (Continued). Part (b): Upper and/or lower acceptable average test values (for shipment or use) applicable to various grades for unit of production indicated in Part (a).
XLIV	Acceptance limits. (Continued). Part (c): If some units indicated in Part (a) are rejected as a unit without further testing, indicate below limiting average test values which do not cause rejection and which permit subdivision of Part (a) units for retesting.
XLV	Acceptance limits. (Continued). Part (d): Next largest unit of production which is accepted for this test property (for shipment or use) without further testing.
XLVI	Acceptance limits. (Continued). Part (e): Limiting average test values acceptable for shipment or use of unit of production indicated in Part (d).
XLVII	Acceptance limits (Continued). Part (f): Is acceptance or rejection of Part (d) units final on basis of original test for conformance with acceptance limits in Part (e). Part (g): If answer to Part (f) is "no," describe any additional procedure for retesting unaccepted product.

TABLE XXXVIII

TEST PROPERTIES HAVING ACCEPTANCE LIMITS

Mill Q	Mill R
26 lb.	
Weight	Weight
Mullen	Mullen
Moisture	Moisture
Porosity	Cobb Size
33 lb.	
Weight	Weight
Mullen	Mullen
Moisture	Moisture
Porosity	Cobb Size
38 lb.	
Weight	Weight
Mullen	Mullen
Moisture	Moisture
Porosity	Cobb Size
42 lb.	
Weight	Weight
Mullen	Mullen
Moisture	Moisture
Porosity	Cobb Size
47 lb.	
	Weight
	Mullen
	Moisture
	Cobb Size

TABLE XXXIX

TEST INSTRUMENT AND CALIBRATION DATA

Mill	(1) Name and Model of Test Instrument	(2) How Frequently are Paper Machine Control Test Instruments in Regular Use Calibrated?	(3) Describe Briefly Procedure Used for Calibrating or Standardizing Test Instruments and Their Key Components	(4) Instrument Calibration is Performed How Often by: (a) Testing Personnel	(b) Testing Supervisor	(c) Instrument Mechanic	(d) Other
	Name of Test Property: Basis Weight						
Q	Toledo basis weight scale	Weekly	Standard weights		Weekly		
R	Testing Machines--No. 7290	Every 8 hours	Check level, zero point and midscale with check weight	Every 8 hours			
	Name of Test Property: Mullen						
Q	Perkins Mullen Tester	Weekly	Instrument gage is checked against standard gage for accuracy.		Weekly		
R	Perkins Mullen Tester No. 11239, Unit 758	Monthly (weekly or oftener when on board)	Mullen tester calibrated with aluminum foil. Gages tested on dead-weight tester using glycerine.		See Part 2.	Gages (monthly)	
	Name of Test Property: Moisture						
Q	Oven and balance	Daily	Standard weights and thermometer.	Hourly	Daily		
R	Oven strip method	None required	---	---	---	---	---
	Name of Test Property: Porosity						
Q	Gurley S-P-S smoothness tester	Daily	Instrument is checked for proper oil level and for "zero" air leakage on the platens.		Daily		
	Name of Test Property: Cobb Size						
R	Gurley Cobb size tester	None required	---	---	---	---	---

TABLE XL

SECTION 5 OF QUESTIONNAIRE: CONDITIONING DATA

Mill	(a) Are Board Acceptance Samples Conditioned Before Testing?	(b) If Samples are Conditioned, Describe Conditioning Procedure Briefly	(c) Are Samples Tested Under Controlled Conditions of Temperature and Humidity?	(d) If Testing Is Performed Under Controlled Conditions, Describe Conditions
	Name of Test Property: Basis Weight			
Q	Yes	2 hr. at 73°F. and 50% R.H.	Yes	73 ± 2°F.; 50 ± 1% R.H.
R	Yes	2 hr. at 73°F. and 50% R.H.	Yes	73 ± 1°F.; 50 ± 2% R.H.
	Name of Test Property: Mullen			
Q	Yes	Mullen reel strip is conditioned for two hours at 73°F. and 50% R.H. before testing.	Yes	73 ± 2°F.; 50 ± 1% R.H.
R	Yes	Samples conditioned 2 hr. in humidity room before testing.	Yes	73 ± 1°F.; 50 ± 2% R.H.
	Name of Test Property: Moisture			
Q	No		Yes	73 ± 2°F.; 50 ± 1% R.H.
R	No		No	
	Name of Test Property: Porosity			
Q	No		Yes	73 ± 2°F.; 50 ± 1% R.H.
	Name of Test Property: Cobb Size			
R	Yes	2 hours at 73°F. and 50% R.H.	Yes	73 ± 1°F.; 50 ± 2% R.H.

TABLE XLI

SECTION 6 OF QUESTIONNAIRE: SAMPLING DATA

Mill	(a) Describe Form of Reel Sample, Number of Specimens per Reel Sample, Number of Measurements per Specimen, Distribution of Measurements Across Machine, and Orientation of Measurements With Respect to Specimens	(b) If Roll Samples are Used, Supply Same Information For Them.	(c) If Samples Are Used to Represent Other Units of Product (Such as a Set of Rolls) Supply Same Information for Them.
	Name of Test Property: Basis Weight		
Q	12" x 12" front, center, and back positions.	42-lb. water finish basis weight by roll.	
R	One 24" x 36" sample each reel from 4 positions: F, FC, BC, B. Each sample weighed.		
	Name of Test Property: Mullen		
Q	Approx. 6" M.D. reel strip. Strip is tested five times per side.		
R	24" x 36" sample from B, BC, FC, and F of each reel; 4 pop tests per sample in CMD of sample.	Only for recheck.	
	Name of Test Property: Moisture		
Q	Moisture sample is taken from entire reel strip.	Strip across entire roll is used for moisture determination.	
R	One strip, approximately 5" wide, full reel width, taken at reel turn-up, quickly placed in screw-top bottle and brought to laboratory for weighing and drying.	No roll samples normally taken.	Above strip (Part A) applies to reel and all sets included; number of sets varies with customer diameter requirements.
	Name of Test Property: Porosity		
Q	Sample taken across reel. Three tests equally spaced taken.		
	Name of Test Property: Cobb Size		
R	One 24" x 36" sample from each reel taken at four positions: B, BC, FC, F. One Cobb test per set of samples, rotating position tested each reel. Average of top and bottom sides reported.		

TABLE XLII

SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS

Part (a): Indicate below by checking appropriate line largest unit of production which is accepted for this test property for shipment or use without further testing.

Unit of Production	Test Property: Basis Weight		Test Property: Mullen		Test Property: Moisture		Test Property: Porosity	Test Property: Cobb Size
	Mill Q	Mill R	Mill Q	Mill R	Mill Q	Mill R	Mill Q	Mill R
One reel	✓		✓		✓[b]	✓	✓	✓
One roll								
Other		✓[a]		✓[a]				

[a] Rolls corresponding to position tested

[b] Water finish by roll.

TABLE XLV

SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS (Continued)

Part (d): Indicate below next largest unit of production which is accepted for this test property for shipment or use without further testing.

Unit of Production	Test Property: Basis Weight		Test Property: Mullen		Test Property: Moisture		Test Property: Porosity	Test Property: Cobb Size
	Mill Q[a]	Mill R	Mill Q[a]	Mill R	Mill Q[a]	Mill R	Mill Q[a]	Mill R
One set of rolls				✓		✓		✓
One roll		✓						
Other (describe)								

[a] No data.

TABLE XLIII

SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS (Continued)

Part (b): Indicate below upper and/or lower acceptable average test values (for shipment or use) applicable to various grades for unit of production indicated in Part (a) of Section 7.

	Test Property: Basis Weight		Test Property: Mullen		Test Property: Moisture		Test Property: Porosity	Test Property: Cobb Size
	Mill Q	Mill R	Mill Q	Mill R	Mill Q	Mill R	Mill Q	Mill R
26-lb. Grade								
Finish	DF	--	DF	--	DF	--	DF	--
Market shipments:								
Lower limit	25-1/3	25.5	65	55	5	4.0	25	--
Upper limit	26-1/3	--	--	--	6	7.0	300	0.45
For intracompany use:								
Lower limit	25-1/3	25.5	65	55	--	4.0	25	--
Upper limit	26-1/3	--	--	--	--	7.0	300	0.45
33-lb. Grade								
Finish	DF	--	DF	--	DF	--	DF	--
Market shipments:								
Lower limit	32-1/3	32.5	84	70	5	4.0	30	--
Upper limit	33-1/3	--	--	--	6	7.0	300	0.45
For intracompany use:								
Lower limit	32-1/3	32.5	84	70	--	4.0	30	--
Upper limit	33-1/3	--	--	--	--	7.0	300	0.45
38-lb. Grade								
Finish	DF	--	DF	--	DF	--	DF	--
Market shipments:								
Lower limit	37-2/3	37.5	92	75	5	4.0	25	--
Upper limit	38-1/3	--	--	--	6	7.0	300	0.45
For intracompany use:								
Lower limit	37-2/3	37.5	92	75	--	4.0	25	--
Upper limit	38-1/3	--	--	--	--	7.0	300	0.45
42-lb. Grade								
Finish	WF	--	WF	--	WF	--	WF	--
Market shipments:								
Lower limit	42	41.5	100	90	6	4.0	30	--
Upper limit	43	--	--	--	8	7.0	300	0.45
For intracompany use:								
Lower limit	42	41.5	100	90	--	4.0	30	--
Upper limit	43	--	--	--	--	7.0	300	0.45
47-lb. Grade								
Finish	--	--	--	--	--	--	--	--
Market shipments:								
Lower limit	--	46.5	--	95	--	4.0	--	--
Upper limit	--	--	--	--	--	7.0	--	0.45
For intracompany use:								
Lower limit	--	46.5	--	95	--	4.0	--	--
Upper limit	--	--	--	--	--	7.0	--	0.45

TABLE XLIV

SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS (Continued)

Part (c): If some units indicated in Part (a) of this section are rejected as a unit without further testing, indicate below limiting average test values which do not cause rejection and which permit subdivision of Part (a) units for retesting.

	Test Property: Basis Weight		Test Property: Mullen		Test Property: Moisture		Test Property: Porosity	Test Property: Cobb Size
	Mill Q[a]	Mill R	Mill Q	Mill R	Mill Q[a]	Mill R	Mill Q [a]	Mill R
26-lb. Grade								
Finish	--	DF	--		--			--
Market shipments:								
Lower limit	-25.5	65	-55		-4.0			--
Upper limit	--	--	--		+7.0			0.45-0.60
For intracompany use:								
Lower limit	-25.5	65	-55		-4.0			--
Upper limit	--	--	--		+7.0			0.45-0.60
33-lb. Grade								
Finish	--	DF	--		--			--
Market shipments:								
Lower limit	-32.5	84	-70		-4.0			--
Upper limit	--	--	--		+7.0			0.45-0.60
For intracompany use:								
Lower limit	-32.5	84	-70		-4.0			--
Upper limit	--	--	--		+7.0			0.45-0.60
38-lb. Grade								
Finish	--	DF	--		--			--
Market shipments:								
Lower limit	-37.5	92	-75		-4.0			--
Upper limit	--	--	--		+7.0			0.45-0.60
For intracompany use:								
Lower limit	-37.5	92	-75		-4.0			--
Upper limit	--	--	--		+7.0			0.45-0.60
42-lb. Grade								
Finish	--	WF	--		--			--
Market shipments:								
Lower limit	-41.5	100	-90		-4.0			--
Upper limit	--	--	--		+7.0			0.45-0.60
For intracompany use:								
Lower limit	-41.5	100	-90		-4.0			--
Upper limit	--	--	--		+7.0			0.45-0.60
47-lb. Grade								
Finish	--	--	--		--			--
Market shipments:								
Lower limit	-46.5	--	-95		-4.0			--
Upper limit	--	--	--		+7.0			0.45-0.60
For intracompany use:								
Lower limit	-46.5	--	-95		-4.0			--
Upper limit	--	--	--		+7.0			0.45-0.60

[a] No data.

TABLE XLVI

SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS (Continued)

Part (e): Indicate below limiting average test values acceptable for shipment or use of unit of production indicated in Part (d) of this section.

	Test Property: Basis Weight		Test Property: Mullen		Test Property: Moisture		Test Property: Porosity	Test Property: Cobb Size
	Mill Q[a]	Mill R	Mill Q[a]	Mill R	Mill Q[a]	Mill R	Mill Q[a]	Mill R
			26-lb. Grade					
Finish	--		--		--			--
Market shipments:								
Lower limit	25.5		55		4.0			--
Upper limit	--		--		7.0			0.45
For intracompany use:								
Lower limit	25.5		55		4.0			--
Upper limit	--		--		7.0			0.45
			33-lb. Grade					
Finish	--		--		--			--
Market shipments:								
Lower limit	32.5		70		4.0			--
Upper limit	--		--		7.0			0.45
For intracompany use:								
Lower limit	32.5		70		4.0			--
Upper limit	--		--		7.0			0.45
			38-lb. Grade					
Finish	--		--		--			--
Market shipments:								
Lower limit	37.5		75		4.0			--
Upper limit	--		--		7.0			0.45
For intracompany use:								
Lower limit	37.5		75		4.0			--
Upper limit	--		--		7.0			0.45
			42-lb. Grade					
Finish	--		--		--			--
Market shipments:								
Lower limit	41.5		90		4.0			--
Upper limit	--		--		7.0			0.45
For intracompany use:								
Lower limit	41.5		90		4.0			--
Upper limit	--		--		7.0			0.45
			47-lb. Grade					
Finish	--		--		--			--
Market shipments:								
Lower limit	46.5		95		4.0			--
Upper limit	--		--		7.0			0.45
For intracompany use:								
Lower limit	46.5		95		4.0			--
Upper limit	--		95		7.0			0.45

[a] No data

TABLE XLVII

SECTION 7 OF QUESTIONNAIRE: ACCEPTANCE LIMITS (Continued)

	Part (f): Is acceptance or rejection of Part "d" units final on basis of original test for conformance with acceptance limits in Part (e)?	Part (g): If answer to Part (f) is "no," describe any additional procedure for retesting unaccepted product indicating who decides (1) whether or not retesting is to be performed, and (2) how much retesting is done. Include information on any resampling required.
Test Property: Basis Weight		
Mill Q	Note a.	
Mill R	No	Rolls corresponding to failed test position resampled. Recheck called for by shift chemist or paper tester on duty.
Test Property: Mullen		
Mill Q	Note a.	
Mill R	Yes	Paper tester and/or shift chemist call for roll recheck in reel position failing (all rolls of reel in this position).
Test Property: Moisture		
Mill Q	Note a.	
Mill R	Yes	Shift chemist or chief chemist calls for roll retesting in circumstance of failed test. Rolls are slabbed down and resampled.
Test Property: Porosity		
Mill Q	Note a.	
Test Property: Cobb Size		
Mill R	No	In event of high test, samples representative of all sets of reel rechecked. Shift chemist or chief chemist.

[a] No data.

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